出國報告（出國類別：洽公）

參加2011年WANO-AC「核安標竿訪問隊」至日、韓國考察友機構核安文化措施

服務機關：台灣電力公司龍門核能發電廠

姓名職稱：　　魏 天 佑　機 械 經 理

派赴國家：　　韓國、 日本

出國期間：　自 100/ 11 / 07 至 100 /11/17

報告日期：　　101/01/16

行政院及所屬各機關出國報告提要

出國報告名稱：參加 2011 年 WANO-AC「核安標竿訪問隊」至日、韓國考察友機構核安文化措施

頁數 125 含附件：■是□否

出國計畫主辦機關/聯絡人/電話

台電公司人事處/陳德榮 /23667685

出國人員姓名/服務機關/單位/職稱/電話

魏天佑/ 龍門核能發電廠/機械組/經理/02-24903880 ext 3500

出國類別：□1 考察□2 進修□3 研究□4 實習■5 其他

出國期間：100/11/07 至 100/11/ 17 出國地區：韓國、日本

報告日期：101 年 1 月 16 日

分類號/目

關鍵詞：核安文化

內容摘要：（二百至三百字）

本出國任務即是應 WANO-AC 邀請本公司派員參加 2011 年 11 月 7 日至 17 日韓國、日本核安文化標竿訪問隊，參訪韓國 KHNP 及日本 JANTI，了解日本及韓國核電廠核安文化的做法，除協助 WANO 完成此核安文化標竿訪問外，亦利用此機會，了解韓、日核電廠目前核安文化的做法，作爲本公司精進核安文化的參考。
韓電是目前全世界核能發電唯一不受福島核災事件影響的核能發電公司，繼續以每年一部機的速度在增設中，韓電在核安文化的建立，起初是向國外核能機構取經，後續自我發展出一套自我專屬的核安文化制度；日本 JANTI 表示，福島事故後，正是推廣核安文化最好的時機。

本文電子檔已傳至出國報告資訊網（http://open.nat.gov.tw/reportwork）

目次:

緣由及目的:

2002 年 Davis-Besse 因管理經營問題，輕忽爐蓋控制棒穿越管洩漏硼酸聚積問題，導致爐蓋嚴重腐蝕，幾乎造成嚴重的 LOCA 事件，WANO 及 INPO 鑒此，憂慮核安文化缺失的危機，規劃四個訪問隊並邀請 PEER 成員參與，對全球，包括南歐、西歐、及韓、日及中國與台灣等各核電廠進行核安文化標竿訪問，預計在 2011 年底完成參訪任務，借此了解各國核安文化的做法，並於完成各區域之參訪後，以僅就各核電廠核安文化做法說明，不對好壞做評判的方式，在期刊發表提供給各核電廠精進核安文化之參考借鏡，本公司核一廠亦原定於 2011 年 11 月接受核安文化參訪，後因該訪問隊隊長醫務問題，延後至今年受訪。

本出國任務即是應 WANO-AC 邀請本公司派員參加 2011 年 11 月 7 日至 17 日韓國、日本核安文化標竿訪問隊，參訪韓國 KHNP 及日本 JANTI，了解日本及韓國核電廠核安文化的做法，除協助 WANO 完成此核安文化標竿訪問外，亦可利用此機會，了解韓、日核電廠目前核安文化的做法，作爲本公司精進核安文化的參考。

參訪過程:

本次參訪團成員除本公司本人參與外，包括領隊 Daniel Glassic(INPO)、Bob Paley(INPO)、Marian Kellet (Peer from Columbia Station)等 4 人。以下爲相關人員資料:

DANIEL D. GLASSIC

Daniel D. Glassic is Senior Evaluator at the Institute of Nuclear Power Operations and is responsible for leading evaluations and assistance activities in the areas of the maintenance, work management, and operations. He is also project manager for the Institute's strategic focus areas to develop and implement Centers of Excellence on Safety Culture, Leadership, Sustainability and Management.

Mr. Bob Paley

Plant & Corporate Evaluations
OR Team Leaders
Team Leader
On Loan from: PPL Susquehanna, LLC

MARIAN KELLETT

Marian Kellett is a manager at Energy Northwest/Columbia

Generating Station and has been with the company for twenty-two years. Current responsibilities include membership on the Corporate Nuclear Safety Review Committee in the area of organizational excellence, the Utilities Service Alliance (USA) Management Council representative with responsibility for oversight and coordination of USA activities, and the management and leadership of Energy Northwest's Document and Data Services department.

本次參訪對象爲韓國及日本，韓國爲水力原子力電力公司(KHNP)及其所屬在光州的 Yonggwang 核電廠#3、4 號機，日本則爲參訪在東京的日本原子力技術協會(JANTI)，並由 JANTI 安排浜岡核電廠負責核安文化相關人員於會中簡報浜岡核電廠核安文化的推動執行狀況，參訪行程如下:

100 年 11 月 7 日(一)

桃園中正機場(12:10)----韓國首爾仁川機場 (15:35)

與參訪隊成員於晚上住宿的希爾頓飯店會合，相互認識並討論後續參訪事宜。

100 年 11 月 8 日(二)

參訪位於首爾的韓國水力原子力電力公司(KHNP)總公司，與主管核安文化人員討論了解 KHNP 公司推動核安文化的做法。

100 年 11 月 9 日(三)

上午繼續於首爾的韓國水力原子力電力公司(KHNP)總公司，與主管核安文化人員討論了解 KHNP 公司推動核安文化的做法。

下午回飯店整理行囊，搭 18:25 由首爾金浦機場飛光州的韓亞航空，晚上住宿光州 Holiday Inn 飯店。

100 年 11 月 10 日(四)

赴位於光州的 Yonggwang 核電廠#3、4 號機參訪，由 Yonggwang 核電廠簡報推動核安文化的做法。

100 年 11 月 11 日(五)

上午與 Yonggwang 核電廠#3、4 號機運轉值班人員及統包商 KSP 的領班訪談對核安文化的做法和看法。下午參觀 Yonggwang 核電廠的展示館及社區活動中心。

100 年 11 月 12 日(六)

由韓國光州-----首爾-----至日本東京 住宿 Celestine Hotel

100 年 11 月 13 日(日)
例假日

100 年 11 月 14 日(一)---- 100 年 11 月 16 日(三)中午
與 JANTI 安全文化推進部及日本中部電力浜岡電廠品質部門會議討論日本核安文化的推動與浜岡電廠核安文化的做法。

100 年 11 月 17 日(四)
由東京羽田機場回台北松山機場(返國回程)

參訪心得:

韓國水力原子力電力公司(KHNP)核安文化參訪心得:

一、韓國是日本福島核能事故後,核電發展完全不受影響的國家,目前國內有 21 部核能機組營運中,另每年以新增一部機組的速度在增加,所以每年約計有 200 位運轉及 100 位維護新進人員與新加入的承包商人員投入,故對如何讓新進人員迅速的了解核安文化的重要是首要的課題。

二、韓電在福島事故後,韓電體認核安的重要,將主管核安的組織做了調整,將原來位於發電營運之下的核能安全單位升格成直屬總經理下的安全及技術部門,與發電營運部門同階。

三、韓國政府積極的鼓勵及推動核安文化,包括接納 IAEA 的相關安全建議及訂定核能安全日、核安檢查日等,頒獎鼓勵相關業界績優人員等。

四、韓電核安文化是由 INPO 原有 8 大主題,配合國情與文化的差異,內化爲 10 個大主題,如附件一。

五、韓電是一個很有企圖心的公司,自許要建立世上最好的核能安全文化,包括打好核安基礎、積極推動核安精進、建立韓電獨特的安全文化模式等。

核安基礎的建立:

至國外取經(如 IAEA)、建立內部評估指引、分析事故及意外與核安文化的關聯、核安專家培育計畫、建立及經營專家人才庫、經營安全評估隊等。

積極推動核安精進:

舉辦安全文化應用的競賽、利用核安檢查日改善事故發生、發佈相關安全的訊息及海報、將十個 PEER review 發

現的 AFI 指派給十個核電廠來推動改進、出版安全文化的訓練教材及手冊。

建立韓電專屬的安全文化模式:

建立韓電專屬的評估指引、建立管理者及所有員工的 Check List、建立包括維護人員 "STAR" 的安全文化措施、建立安全文化的觀察指引及手冊、安全文化的觀察的一致性、成立核安文化審查委員會等。

六、推動安全監護人計畫

由各電廠及總公司推選安全監護人，集中參加安全監護會議，推選安全監護員、討論發表相關安全監護技巧及文件的填寫等，另每週對公司各單位送出安全(核安)相關訊息，使公司各單位能同步接受相關安全活動資訊及安全活動主題、核安海報等，這些相關的安全資訊亦提供給韓電的承包商 KSP，使電廠與承包商有同步的安全認知與作為。

七、韓電透過訓練來強化核安文化。

韓電對新進人員都要求接受核安文化重要性的訓練，透過 e-learning 對全體員工訓練安全文化、各階層的管理訓練、事故分析、安全文化原則等訓練、邀請管制單位或航空界安全專家針對安全的思考及想法來做演講或活動，韓電除對自身員工從事安全訓練外，對承包商也要求相關之安全訓練，並發展標準課程。

八、Yonggwang 核電廠#3、4 號的營運績效相當優異、自許要成為世上績效最佳的核電廠，廠內每一部門皆有電視，每早利用電視做簡短的安全訊息教育、每日有不同的主題與內容，這些材料由原先提及的安全監護人計畫提供。在與其公司運轉人員訪談時發現，在其討論會議桌上，擺置各種安全文化的手法與技巧規範及說明，使員工在對運轉議題的討論上有共同的準則，另 Yonggwang 核電廠的強項是他們有半政府經營的 KSP 協力商，與其領班訪談時表示，KSP 的待遇不錯、人員素質也很好，流動性低，領班都有一、二十年的維護經驗，對廠內的核安文化要求也相當了解，KSP 的員工也都有一套完整的教育訓練計畫，也有提供 CAP 回報的最低案件數量的要求。

九、Yonggwang 核電廠針對明日安排的工作，會挑一項較重要的工作，並指派一管理階層(如經理)去做核安觀察，並做成記錄，以回饋後續的改善措施，觀察記錄表格如附件二。

十、韓電核安文化的精進措施簡報，如附件三。

日本原子力技術協會(JANTI)核安文化參訪心得:

一、日本核能由 1999 年發生東海村臨界意外事故後，爲強化核安文化，建立了核能安全檢視體系(Nuclear Safety Inspection Framework)；因 2002 年東電 TEPCO 僞造自我檢查記錄，將安全檢查增入品保活動內；後續發生 2004 年美浜核電廠 3 號機破管意外，直到 2007 年在執行各核電廠的檢視時，發現廣泛的僞造事故記錄或數據，於是日本政府立法介入核能安全的領域，利用安全檢查及評估，希望能藉此培養出核安的信念，並藉此發現核安劣化的徵兆。

二、JANTI 持續舉辦安全巡迴研習(Safety Caravan)，包括邀請專家演講、電廠管理者的資訊交換等，到 2011 年 11 月，已辦過 125 次此種活動。

三、JANTI 持續舉辦經營主管的研習，包括安全文化的 workshop、客主關係管理 workshop 等，以增加主管的核安及領導能力，至 2011 年 3 月，已舉辦過 22 次。

四、利用 E-Learing 來訓練核安相關之訊息及技能。

五、積極推動工具箱會議及利用指認呼喚的技巧來強化對危險的確認及改善。

六、利用簡單的中文: 旗、率、礎、承、觀、覺、啓等七個字，各別代表對應的含意，包括:

旗:明白舉出安全爲第一的標旗。
率:管理者身先士卒，做好榜樣。
礎:建立好安全的系統及其基石。
承:能充分的遵循及了解他人的想法及做法。
觀:良好的觀察，發問及學習。
覺:確認潛在的危害。
啓:敞開心胸、充份的發言討論。

使工作人員在看到標示的海報,就能明瞭其安全文化的含意。

七、JANTI 發展出安全文化評估的方法,包括觀察、接談、評估; 對接談或問卷回答的標準化及歸類; 少數人意見的收集; 評估後的建議等，有系統的收集歸納相關回授資訊，做爲後續改善目標差異的參考茲資料。(附件四)

八、日本中部電力浜岡電廠在廠內推動一個"what day is today?" 及"失敗的迴廊"將過去廠內發生或外界(國際)在當日曾發生的案例，每日利用適當的工具，如電視牆、海報、mail、損壞設備的展示等方式，檢討強化核安的危機意識與改善對策。

九、日本各電廠於福島事故後，見於重機械的使用是事故抑低危害重要的措施，故積極的鼓勵員工去取得重機械的駕駛與操作證照，以確保在事故時有充份的重機械操作人力。

十、福島事故，JANTI 在安全文化的 Lessons Learned 包括:

1.改變面對低機率但有嚴重後果事故風險的承擔態度，認真面對萬一發生時，評估會有甚麼嚴重的後果，判斷應採取甚麼適當的措施來應對，及檢視目前的設施是否足以應付此一事故。

2.改變行爲模式，以一虛心的心態，經由相關業界，國際或國內友廠或機構學習及了解安全設計上之差異，收集、分析相關資訊，借此來加強對不正常或錯誤事情的敏感性，及改善對某些原有意或無意忽略及過度自信的一個狀況。

3.再度認知核能安全的重要性，將核能安全擺在更高的要求標準。

十一、參訪 JANTI 的相關簡報資料如附件(五~八)，包括:JANTI'S Promotion of Nuclear Safety Culture 、Overview to Understand of assessment and Improving Safety Culture 、How Can We Foster a Safety Culture?、JANTI'S Idea on Lessons Learned form the Fukushima Daiichi Accident 等 4 份資料。

建議事項:

一、 此次核安文化標竿訪問發現，不管是韓電或日本 JANTI，都有負責的部門做整個公司核安文化的推動，包括政策方針的擬定、精進核安文化計畫擬定及推動、訓練教材編訂、研習的規劃及執行、推廣文宣製作、核安文化評估觀察方法的擬訂或標準化、核安專家的訓練及專家群的建立等，各核電廠主要是配合主管單位的推動計畫，使公司內各單位有一致的核安文化標準；反觀目前公司內雖有核安處主政，但就各廠目前核安文化的推動，似乎有鞭長莫及的感覺，各廠的核安文化推動都是各自有自己的一套，各廠發展出來的核安文化亦有差異，資源分散且重覆，另修護處是國內四個核電廠的主要承包大戶，核安文化的建立亦應納入公司核安文化培養的重點單位，建議強化核安處主管核安文化部門，統合四個廠的核安文化的資源與做法，讓公司內核安文化的推動、文宣、活動、評估能標準化。

INPO의 강력한 안전문화 원칙과 발전소 안전문화 실행 체계 비교

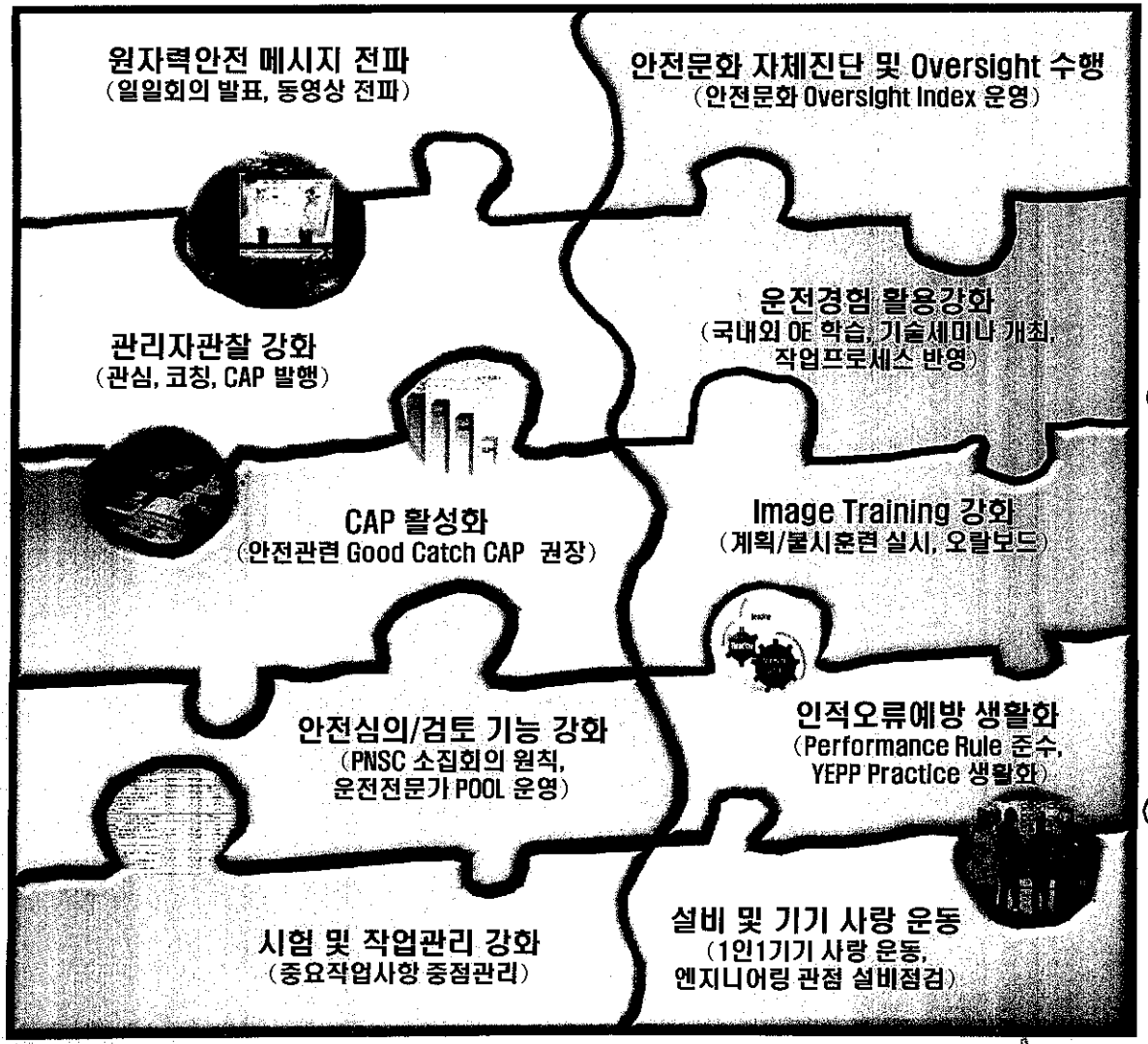
① 원자력안전 책임
Everyone is personally responsible for nuclear safety.
전사관리사항
- 안전정책 성명
- 경영계약
- 표준기행 등

② 리더의 원자력안전 강조
Leaders demonstrate commitment to safety.

③ 조직내 안전문제 제기 신뢰 구축
Trust permeates the organization.

④ 보수적 의사 결정
Decision-making reflects Safety first.

⑤ 원자력안전 중점관리
Nuclear technology is recognized as special and unique.



⑥ 의문을 갖는 태도
A questioning attitude is cultivated.

⑦ 조직내 학습 분위기
Organizational learning is embraced.

⑧ 지속적 안전진단
Nuclear safety undergoes constant examination.

한국수력원자력[주]
영광 제2발전소

세계 최우수 발전소 만들기

0534813209328S3

관리자 관찰표

▶ 대상호기 : _____ 호기

▶ 관찰일시 : _____년 ____월 ____일

___시___분 ~ ___시___분(___분간)

▶ 작 업 명 : _____

▶ 대상부서 : _____

▶ 관 찰 자 : _____부____장____

(☎_____)

관찰 주안점

1. 관찰 중 비정상 행위 확인 시 즉시 시정 되도록 한다.
2. 관찰로 인하여 작업 또는 시험에 영향을 주지 않도록 한다.
3. 관찰은 "현장 순시"가 아니며 "작업자나 시험자의 행위가 개선" 되도록 수행한다.
4. 개선필요사항 도출시 관련부서에 즉시 통보 하고, 운영개선프로그램(CAP)에 등록한다.

▷불안전한 행위 예방		
- 위험요소의 내재 여부	☐	☐
- 작업장 주변 방해물 존재 여부	☐	☐
- 화재발생 가능성 및 예방조치	☐	☐
- 위험발생 가능성 및 예방조치	☐	☐
- 안전난간에 기대는 행위, 안전난간에 클램프를 체결하여 작업하는 행위 등	☐	☐
- 중량물 인양 작업 시 신체의 무리한 동작 여부	☐	☐
- 중량물 이동은 장비이용	☐	☐
- 전원케이블 등의 꼬임 여부	☐	☐
- 중량물 이동시 도움 요청 여부	☐	☐
- 과도한 움켜쥠/힘/밀음/당김을 피할 것	☐	☐
- 안전한 이동속도 유지 (보행, 기중기 및 전동차 등)	☐	☐
- 중량물의 상하 이동시 3점(3 Point) 고정 확인	☐	☐
- 의사소통 재확인 기법(3Way Communication) 사용	☐	☐
- 몸의 불필요 장신구 제거여부 (전기 및 기계적 위험 사전제거)	☐	☐
- 다른 잠재적 위험의 인지 및 시정	☐	☐
▷개인 안전장구 및 보호구 착용		
- 머리 - 안전모 착용	☐	☐
- 눈/안면 - 요구되는 보안경/안면보호대 착용	☐	☐
- 청각보호 - 적절한 귀마개(Ear Plug/Head Phone) 착용	☐	☐
- 장갑 - 업무수행에 적합한 것	☐	☐
- 감전위험이 있는 작업 수행시 해당 전압에 적절한 절연용 보호구 착용	☐	☐
- 전기 안전복 - FR(Fire Resist), Flash Suit & Hood	☐	☐
- 용접 자켓, FR 작업복 [방사선 방호(RP) 지역에서의 고온작업]	☐	☐
- 추락방지 도구 착용 (2미터 이상 작업시)	☐	☐
- 발 보호 장비-안전화 착용	☐	☐
- 개인 호흡 장비 사용 (필요시)	☐	☐

방사선안전

▶작업장 환경 working ambience

	만족	미흡
- 안전방벽(Safety Barrier) 설치 (필요시)	☐	☐
- 지정된 통로의 이용	☐	☐
- 미끄럽거나 실족 가능한 곳 확인 및 예방 조치	☐	☐
- 작업용 발판의 안전상태 확인	☐	☐
- 사다리의 안전여부 - 상부 가로대 걸치고 작업수행 여부	☐	☐
- 계단 오름/내림 때의 불안정한 동작 여부	☐	☐
- 통로 돌출부의 보호 및 표시 여부	☐	☐
- 비계틀 위에서의 작업 시 안전 여부	☐	☐

▶도구 및 장비 Tool

	만족	미흡
- 양호한 상태인지 점검 여부	☐	☐
- 작업조건에 적합한 장비 선정 여부	☐	☐
- 부적절한 방법으로 장비의 이용 여부	☐	☐
- 절연 도구 사용 여부	☐	☐
- 사용하기 전 장비의 검사 완료 여부	☐	☐
- 보호구 사용 후 제자리 정렬 여부	☐	☐
- 전선의 설치 시 적절한 배치가 되었는지 라우팅 확인 여부	☐	☐
- 호스를 깔았을 경우 통로의 방해 여부	☐	☐
- 압축가스에 대한 보호 캡, 레이블, 보호 및 전도 방지 여부	☐	☐
- 인양 장비 검정 확인	☐	☐

▶방사선 관리구역 출입관리 For Radiation control Area. RCA entrance

	만족	미흡
- RWP / ALARA 검토	☐	☐
- 서베이 결과의 게시 여부	☐	☐
- 방사선준위 게시위치의 적절성	☐	☐
- 출입관리용 설비 동작상태 (ADR, Portal Monitor)	☐	☐
- 작업용품 비치상태	☐	☐
- 관리구역 출입문 동작상태	☐	☐
- 관리구역 표지판 부착상태	☐	☐
- 관리구역 제염 및 청결상태	☐	☐
- 방사선(능) 측정자료 유효성 확인 및 작업자 제공	☐	☐
- 임시차폐 상태	☐	☐

▶방사선 계측장비 관리 measuring tool management

	만족	미흡
- 계측기 성능유지 상태	☐	☐
- 실험실 온 · 습도 유지	☐	☐
- 교정 및 기록 유지	☐	☐
- 기타 청결상태	☐	☐

▶방사선 작업 실시 Rad work

	만족	미흡
- RWP 준수	☐	☐
- 현 방사선 조건에 대한 인지	☐	☐
- 방사선 방호장구(마스크 등) 착용	☐	☐
- ALARA의 적용 (시간, 거리, 차폐 등)	☐	☐
- 작업 중 방사선 안전관리에 대한 관심	☐	☐
- 작업책임자 현장 상주 여부 (필요시)	☐	☐
- 방사선 경보 발생 시 대응 상태	☐	☐

▶방사선 작업 기준 Rad work standard

	만족	미흡
- 적합한 선량계 및 차폐체 사용	☐	☐
- 적합한 방호복 및 방호용품 착용	☐	☐
- RWP에 명시한 지시사항의 준수	☐	☐
- 저 선량지역에서 대기 여부	☐	☐
- 적절한 작업인원 및 방호요원 수	☐	☐
- HEPA/진공 청소기의 사용 여부	☐	☐
- 작업 전 예상피폭선량 산출 등 ALARA 검토	☐	☐
- 작업 전 현장 방사선 조건 확인 및 작업자 제공	☐	☐
- 모의작업훈련(Mock Up) 실시 여부	☐	☐

▶방사선 폐기물 취급 Waste handling

	만족	미흡
- 폐기물 발생 최소화 (소요자재 최적구성)	☐	☐
- 경제적인 자재 사용 실태	☐	☐
- 작업도중 발생 폐기물 처리 (고체/액체)	☐	☐
- 잔여물품 재활용 등 처리계획	☐	☐

▶오염관리 contamination

	만족	미흡
- 작업 후 작업자 오염검사 실시	☐	☐
- 관리구역 내 물품보관 상태 (표지, 로프)	☐	☐
- 작업 후 청결작업 시행	☐	☐
- 누수 · 누유 · 붕산석출 부위 점검	☐	☐
- 관리구역 제염도장 손상 방지	☐	☐
- 오염확산 방지대책	☐	☐
- 비치된 작업용품의 청결상태	☐	☐
- 작업자 방사선 안전관리 규정 준수 여부	☐	☐

일반작업

▶인적실수예방기법 적용	만족	미흡
- 작업전회의(Pre-Job Briefing) 수행	☐	☐
- 조작 전 자기진단(STAR, Stop/Think/Act/ Review) 수행	☐	☐
- 동료점검(Peer Check) 수행	☐	☐
- 절차서(Procedure), 공정(process) 혹은 변수(parameter)를 벗어나면 작업을 멈추고 감독에게 통보	☐	☐
- 의사소통 재확인 기법(3Way Communication) 사용	☐	☐
- 사전점검 (First Check)	☐	☐
- 독립확인(Independent verification) 수행	☐	☐
- 동시확인(Concurrent Verification) 수행	☐	☐
- 인식표(Flagging) 부착 활용	☐	☐
- 운전방벽(Operation Barriers) 설치	☐	☐

▶절차서 준수 및 문서화	만족	미흡
- 최신 개정된 작업관련 서류(절차서, 도면 등) 사용	☐	☐
- 작업자가 절차서 혹은 작업의뢰서 등에서 요구하는 사전 조치사항, 주의사항 및 절차를 준수하는지 여부	☐	☐
- 작업장에 관련 절차서 비치 여부	☐	☐
- 작업이 절차서, 작업의뢰서 등 작업패키지에 따라 수행되는지 여부	☐	☐
- 작업시점에서 서명 여부	☐	☐

▶작업의 수행	만족	미흡
- 작업에 적합한 공구의 선택 및 사용	☐	☐
- 잘 정돈된 작업현장 및 잘 갖춰진 공구 사용	☐	☐
- 분해 전, 재조립을 위해 분해할 기기에 표기 실시	☐	☐
- 적절한 FME 지역 설정 및 준수	☐	☐
- 세밀한 주의, 안전한 작업자세, 보수적인 운영 및 안전 위해요소 점검 여부	☐	☐
- 불확실한 때는 작업을 중단, 재검토 후 수행 여부	☐	☐
- 작업 종료 후 피드백 수행 여부	☐	☐
- 감독이 작업현장에서 감독수행, 공정/요건/ 문제점에 대한 토의 시행	☐	☐
- 작업자가 작업 중에 일어날 수 있는 잠재적인 비정상 상태에 대한 인식 여부	☐	☐
- 예상치 못하거나 비정상상황 발생시 지원부서 확인 여부	☐	☐
- 모든 결함의 식별 여부	☐	☐
- 필요할 때 동료 작업자에게 지도(Coaching) 요청	☐	☐

작업전회의

▶점검 사항	만족	미흡
- 회의주관자의 브리핑을 위한 적절한 준비	☐	☐
- 회의 장소의 적합 여부	☐	☐
- 참석자의 적극적인 참여	☐	☐
- 회의주관자의 전문적이고 충실한 회의 진행	☐	☐
- 토론 내용		
• 작업 목적 및 예상되는 결과, 작업범위	☐	☐
• 책임과 역할, 실수 예방 조치, 잠재적 위험	☐	☐
• 안전 요건, 작업 중지 조건 혹은 감독자 통보 요건	☐	☐
- 효과적인 의사소통 기법의 사용		
• 의문을 갖는 자세, 명확한 질문, 정식 의사소통	☐	☐
- ALARA/화학/FME/밀폐공간에 대한 적절한 토의	☐	☐
- 특수 작업 고려사항 토의	☐	☐
- 회의주관자가 공기단축을 위해 작업자에게 시간적 압박을 주는지 확인	☐	☐
- 운전경험(OE) 및 교훈(Lesson learned)에 대한 토의	☐	☐
- 유사한 실수 사례 / 인적 실수 사례에 대한 토의	☐	☐
- 주의사항 및 보수적 사고 강조	☐	☐
- 절차서 개정 후 당해 시험/작업에 최초 적용 시 주요 개정사항 토의	☐	☐
- 절차서 준수 및 문서화 강조	☐	☐
- 최대 안전 여유 유지 강조	☐	☐
- 회의시 모든 작업자가 주의를 기울임	☐	☐
- 회의주관자가 참석자들 독려 여부	☐	☐

작업후 평가

▶점검사항 Check item

	만족	미흡
- '절차 혹은 지침변경' 평가 적절성	☐	☐
- '산업안전 반영사항' 평가 적절성	☐	☐
- '기기위치 변경사항, 인식표 개선필요사항' 평가 적절성	☐	☐
- '교육훈련 개선사항' 평가 적절성	☐	☐
- '인적실수예방 반영사항' 평가 적절성	☐	☐
- '자재/공구/기기 등의 문제점 존재 여부' 평가 적절성	☐	☐
- '보건물리/ALARA 반영 사항' 평가 적절성	☐	☐

인수인계

▶점검사항

	만족	미흡
- 진행 중인 모든 작업의 상태와 잔여작업에 대한 토의	☐	☐
- 미결된 문제점에 대한 토의	☐	☐
- 처음 수행하는 작업항목에 대한 세부적인 토의	☐	☐
- 효과적인 의사소통 기법의 사용 • 탐구하는 자세, 명확한 질문, 의사소통 재확인기법	☐	☐
- 적절한 장소에서 인계 (소음, 조명, 환기 등)	☐	☐
- 참석자들의 적극적인 참여	☐	☐
- 잠재적인 위험, 안전요건 토의	☐	☐
- 각 개인이 관찰하는 모든 결함을 식별하는지 여부	☐	☐
- ALARA/FME/발전소 상태 등 특별한 요건 토의	☐	☐
- 모든 작업관련 서류 혹은 일지의 검토	☐	☐
- 완료된 작업과 공정들에 대한 완전한 이해 여부	☐	☐
- 특별한 작업상 고려 사항, 특별한 공구, 다른 부서의 지원에 대한 의사소통 여부	☐	☐
- 인계시점이 적절한지 여부	☐	☐
- 인계사항이 문서화되고 있는지 여부	☐	☐
- 현장 인계가 필요한 작업인 경우 작업현장에서 인수인계가 적절히 이루어지는지 여부	☐	☐

▶달성도 등급 Satisfaction level

- ☐ A 매우 우수 very good
- ☐ B 만족 ↓
- ☐ C 약간의 개선 필요
- ☐ D 불만족 unsati —

▶개선 필요 사항 AFI

▶잘하고 있는 사항 Strength

▶지도(Coaching) 실시 Yes No

Y☐ N☐

▶메 모 comment

KHNP

Activities for promoting nuclear safety culture

Safety & Technology Division Safety Department

KHNP

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KHNP

Nuclear Safety Culture

- to lay the foundation for each management program in order to achieve and maintain the best performance

0102613207977765

KHNP

Measures to improve safety

to secure best nuclear safety

Establishment perspective	Management perspective	Facility perspective
Safety inspection home and abroad • regular/probabilistic safety evaluation • Corrective Action Program • Self Assessment • Plant Nuclear Safety Committee • Radiation safe[illegible]agement • [illegible]	• Hiring/training top talent and managing their qualification level • Human performance zero measures • Establishment of operation n capability enhancement system<opera> • Standard[illegible] of	• Improving facility performance • Strengthening management of vulnerable facility • Managing equipment reliability improvement program • Replacin[illegible] facility at

Strong Nuclear Safety Culture

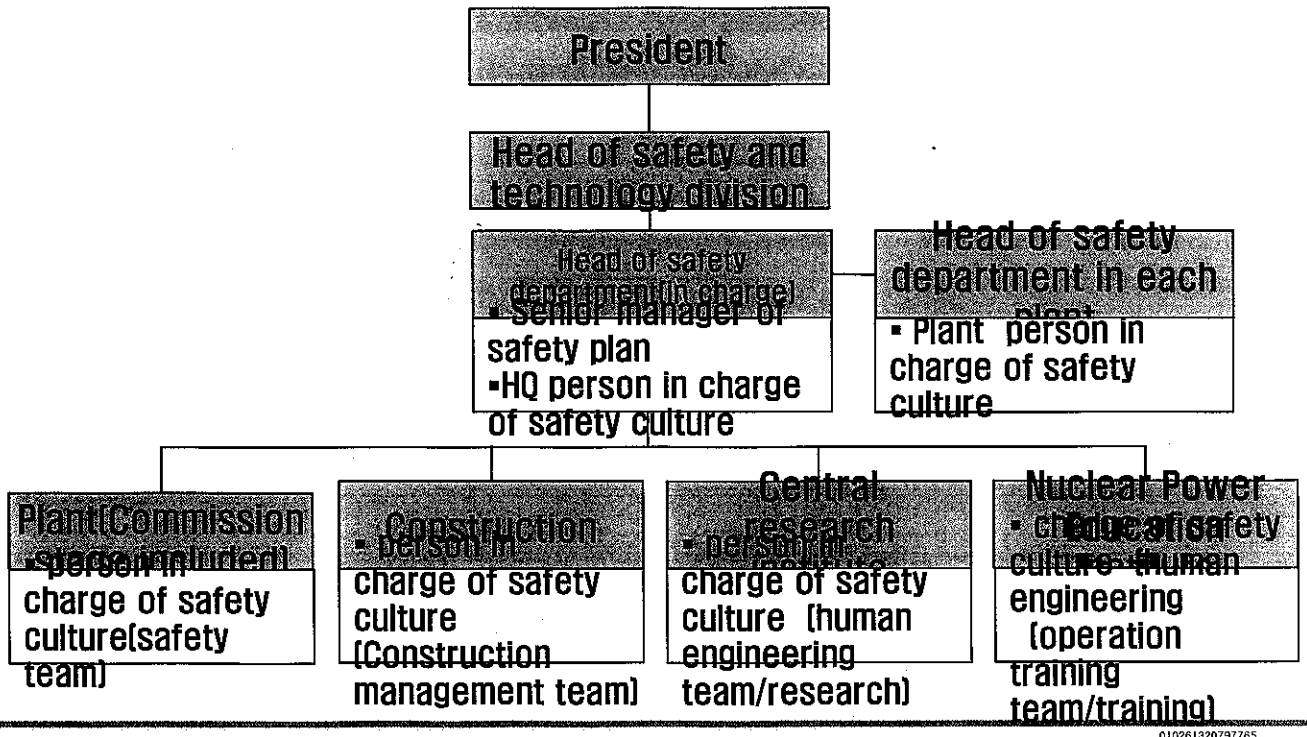
KHNP

목 차

KHNP

KTNP Nuclear Safety Culture

◆ Organization Chart for Nuclear Safety Culture



KHNP

Gov.'s Nuclear safety policy

- Announcement of declaration of Nuclear safety policy(Sep. 1994)
  - -Declared to early internalization of safety
  - -Culture suggested by IAEA
- Designation of nuclear power safety day (Sep.10.1995)
  - - continuous conduction of safety culture campaig
- Declaration of nuclear safety charter9.6.2001
  - - internalization of nuclear safety culture
- Designation of nuclear safety inspection day(
  - - proactive nuclear facility protection and internalization of safety culture by all workers, safety guardian award (2009)
- Countermeasure to handle human error(12.6.2006 32nd NSC)
  - - From 2007, as part of short term measure, in regular inspection, HuPI was established and implemented to enhance inspection on human factor

원자력안전헌장

우리는 원자력의 평화적 이용이 국가의 발전과 국민의 삶의 질 향상에 기여함을 인식하고, 원자력을 안전하게 관리하여 국민을 보호하고 환경을 보존하는 것이 최우선임을 확인하면서 다음과 같이 다짐한다.

1. 원자력의 이용에 있어 최상의 안전수준을 유지한다.
1. 원자력 안전에 관한 정보를 신속하고 투명하게 공개한다.
1. 원자력 안전 시책 수립에 있어 국민의 의견을 수렴한다.
1. 원자력 안전규제의 독립성과 공정성을 보장한다.
1. 원자력 안전에 관한 연구와 기술개발을 강화한다.
1. 원자력 안전에 관한 법규와 국제조약을 성실히 이행한다.
1. 원자력 안전에 관한 법과 제도를 지속적으로 보완발전시킨다.
1. 원자력 안전문화를 창달하고 이를 생활화한다.

2001년 9월 6일

KHNP

KHNP Safety Policy(safety policy statement/ethic code)

원전 안전정책성명

우리는 원전 운영에 따른 안전목표가 방사선 재해로부터 국민의 건강과 환경보전에 있음을 깊이 인식하고, 우리 회사의 기업윤리강령에서 안전최우선의 의지를 확고하게 천명한 바 있다.
이에 우리는 원전 안전에 대한 우리의 의지를 바탕으로 국민이 안심하는 최상의 안전성을 유지하고자 다음과 같이 원전 안전정책 성명을 제정하고 이를 원전 안전성 증진의 기준으로 삼고자 한다.

1. 우리는 원자력발전소의 기존 안전성 확인 기법과 더불어 최신 안전관리체계를 구축하여 최상의 안전수준을 유지한다.
2. 우리는 원자력발전소의 안전성 확보가 조직문화에 깊이 관계되어 있음을 인식하여 안전문화를 생활화 한다
3. 우리는 원자력발전소의 정비기술 향상과 철저한 품질활동을 통하여 설비신뢰도를 제고한다.
4. 우리는 원자력발전소의 방사선을 안전하게 관리하여 주변 주민과 환경을 보호한다.
5. 우리는 원자력발전소의 설계안전성을 높이고 시공감리를 강화하여 안전성이 향상된 원자력발전소를 건설한다.
6. 우리는 원자력발전소의 안전에 관한 정보를 신속하고 투명하게 공개하여 국민의 신뢰를 확보한다.

2003.12.23

한국수력원자력㈜

기업윤리강령

한국수력원자력㈜

우리는 문명사회의 필수 에너지인 전력을 생산하여 국민의 '삶의 질'을 획기적으로 향상시키는데 중추적인 역할을 해 왔다.
우리는 '원전의 안전성'을 최우선시 하며, 기업이념을 『국민이 신뢰하는 세계 최우수 전력회사 창조』로 하고, 중장기 비전인 『인간, 환경, 기술을 중시하는 세계 전력시장의 뉴 리더』를 실현하기 위해 최선의 노력을 경주한다.
이에 우리회사의 기업이념을 바탕으로 깨끗하고 투명한 기업문화를 이룩하고자 다음과 같이 윤리강령을 제정하고, 이를 모든 임직원의 행동과 가치판단의 기준으로 삼고자 한다.

1. 경제적이고 품질 좋은 전력을 안정적으로 공급함으로써 국민에게 최대의 만족과 편익을 준다.
2. 원전의 안전성과 기술력 향상을 위해 끊임없이 노력하고, 안전성과 관련된 정보는 신속하고 투명하게 공개한다.
3. 발전소 주변지역에 대한 지원사업 등을 지속적으로 추진함으로써 지역사회 발전에 기여하고 지역주민과의 공동번영을 추구한다.
4. 환경오염을 예방하고 지구환경의 보전과 개선에 앞장서기 위해 환경친화적 경영을 추구한다.
5. 비효율적인 업무관행을 과감히 타파하여 국민이 신뢰하는 기업상을 정립한다.
6. 직무와 관련하여 부당한 이익을 도모하거나 지위를 남용하지 아니하며, 공익기업으로서의 책임을 다한다.
7. 노사는 모두 회사의 주인이라는 자부심을 가지고 신뢰와 화합을 바탕으로 공생자적 관계를 구축한다.

KHNP

CEO Management Policy

NEW Challenge
글로벌 일류 발전회사

효율·신뢰·창조

- 안전 최우선 경영
- 글로벌 경쟁 우위확보
- 화합경영 실현
- 성과중심 경영

※ NEW challenge
Nuclear Energy World-best (세계 최우수 원자력회사)를 향한 한수원의 새로운 도전(Challenge)을 상징

[President's declaration for

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Policy perspective(to be continued)

safety management organization

- ❖ Company Policy : organization 0100(title rule), organization 0300(responsibility authority rule)
- ❖ Standard technical administration procedure : operation-01(responsibility and authority on plant operation unit),
  operation-04(nuclear power plant operation reporting and information disclose process)

Securing resources (manpower, budget

- ❖ Company policy : Organization 0100(title rule), management 0300(budget and operation plan rule)

Self Regulation system

- ❖ Company policy: Audit 0100(audit position rule), Management 0200(QA rule)
- ❖ Standard technical administration procedcure: operation-11(Self Assessment)
- ❖ Others: IAEA OSART, WANO PR, KOSART

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Manager perspective(KHNP)

Clear line of responsibility

- ❖ Company policy : organization 0100(title rule), organization 0300(responsibility and authority rule)
- ❖ Standard technical administration procedure: operation-01(responsibility and authority on
- ❖ Plant operation organization
- ❖ Others: all procedures clearly dictate each responsibility

Clear assignment of task and management

- ❖ Standard procedure: op-09(PJB meeting and Post job critique), safety-04(management observation)
- ❖ Others : all procedures clearly dictate each responsibility

Training and Qualification Management

- ❖ Standard procedure: training-02(education and training & task capacity qualification procedure), test-05(test supervisor qualification management)
  op06(plant employees qualification management)
- ❖ Others: radiation protection training, fire protection training, IS training

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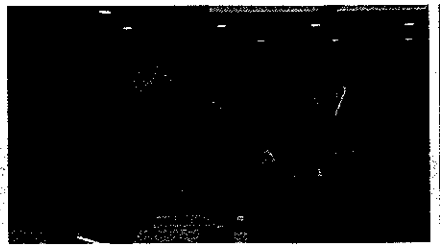
Manager perspective(to be continued)

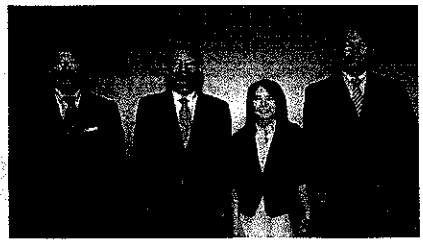
Reward and Penalty

- ❖ Company policy: HR 0100(Human resource management rule)
- ❖ others: Nuclear power safety day(Government and company wide), safety guardian award by Gov. best pilot reward, best quality improvement reward

[reward for contributing to safety



[reward for best pilot]



[reward for improving quality]

Audit, Inspection and Comparison

- ❖ Company policy :Audit 0100(audit duty rule), management 0200(QA rule)
- ❖ Others: PSA, PSR, SA, Safety inspection home and abroad, safety culture evaluation

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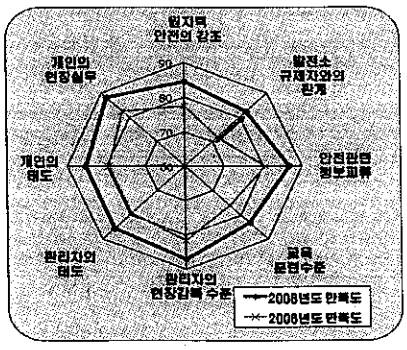
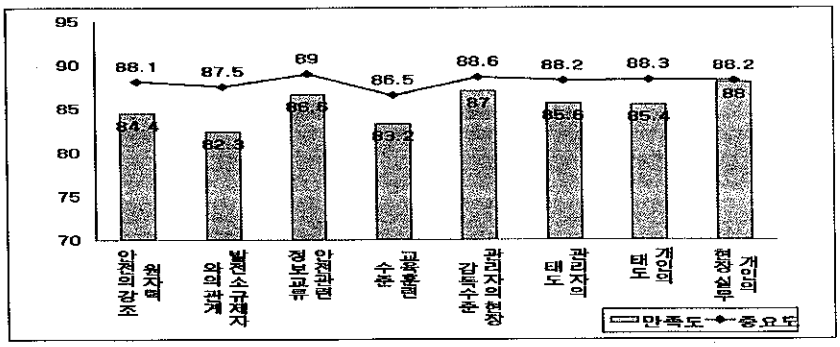
Manager perspective(safety culture evaluation)

Conduction of safety culture evaluation and Feedback every two years





➢ *satisfaction level : Item current status, Importance : contribution to safety*

AFI

- ❖ Continuous Emphasis on Nuclear safety
- ❖ Improving relations with Regulators
- ❖ Enhancing safety-related Training
- ❖ Establishment of permanent diagnosis system on safety culture
- ❖ Evaluation and training for contractors' workers
- ❖ Improvement of safety culture evaluation method

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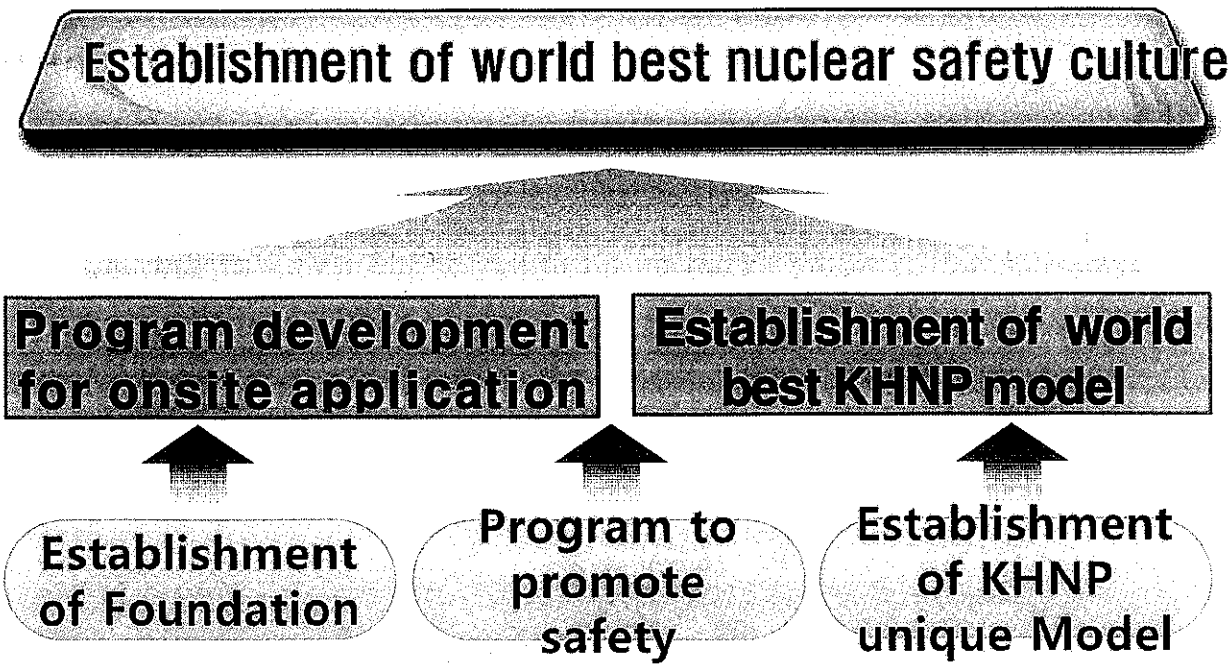
Blue print for Enhancing Nuclear Safety Culture



Establishment of Foundation

- Research on overseas trend regarding safety culture
- Redefinition of R&R in Organization
- Creation and Improvement of Inside Evaluation Index
- Analysis on safety cultured related Accident and Incident
- Development of Expert Nurturing Program
- IAEA SCART Inspection
- Composing and managing expert pool
- managing safety culture evaluation team

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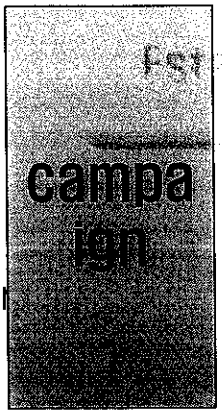
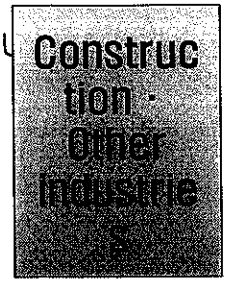
Program for improving safety

- to conduct practical safety culture campaign
- to improve the event for unclear safety inspection day
- to distribute safety message and poster
- to enhance safety culture and execute Ten&Ten
- to publish training material on safety cu
- to publish handbook on safety culture





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Establishment of KHNP model

- to develop KHNP unique evaluation guidelines
- to develop Check List for managers and all employees
- to improve notice and order process
- to establish 'STAR' campaign doctrine for MA staffers
- to develop observation index for safety culture
- to develop safety culture comprehensive manual
- to manage and optimize safety inspection in unified way
- to run nuclear safety culture review committee

Nurturing Experts on nuclear safety culture

◆ Background

–need to enhance safety mindset of KHNP and contractors' workers

– need to nurture experts in order to promote fast and efficient onsite safety culture

◆ Measures to improve

– to run expert nurturing training program

– to invite overseas experts and commission training to overseas institutes

– to bring together contractors and provide visit training – to enhance customized step–by–step training and e–learning effectiveness

Nurturing Experts on nuclear safety culture

◆ Expert nurturing training

– First round: 5. 12.2011 ~ 13/Central research institute

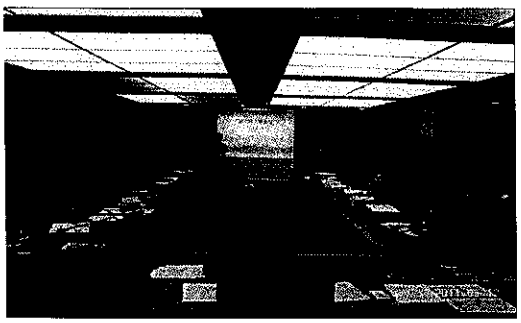
– Second round: 9.1.2011 ~ 2/Nuclear power education institute

– Trainees : a total of 77

· HQ and Special Biz unit: management in charge of safety culture and rank employees

Plant(commissioning included): executive–director, safety senior manger, assistant manager

· Construction unit: executive–director, senior manager in constrcuction management, safety assistant manager



<Expert nurturing training>

Task of Expert on nuclear safety culture

- to improve understanding of nuclear safety culture

–to spread via lectures on safety culture for KHNP and contractors–to serve as foundation for awareness and implementation of safety culture

- to lead campaign for nuclear safety culture

– to lead onsite practical campaign

– to decide whether to implement campaign according to management' s mindset

- to provide feedback for continuous safety culture enhancement

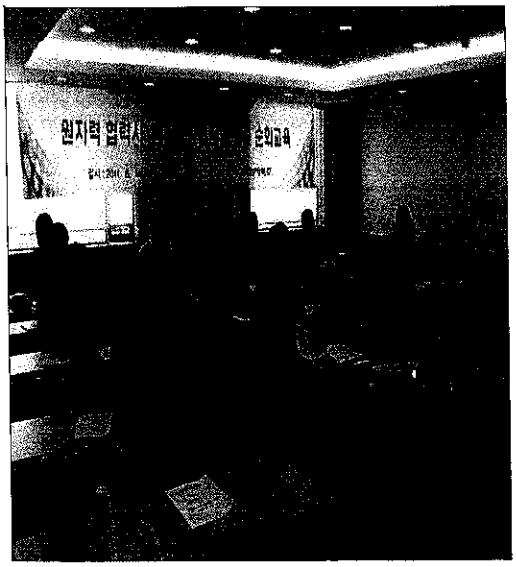
– to provide how to improve current safety culture policy and plan

– to offer continuous interests and ideas on future safety culture policy

Nurturing Experts on nuclear safety culture

- Contractor training(March.2011)

– Training led by QA team(eight times), training led by Construction department(five times



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Safety Guardian Program

- Purpose

– to enhance efficiency and speed of tasks conducted for onsite safety culture

–to promote practical onsite nuclear safety culture activities

- Organization Chart

– HQ: Safety department safety planning team assistant manger in charge

– Plant: Research assistant manager of plant(commissioning included)

- Major R&R

– to distribute weekly nuclear safety culture message (everyThus day)

– to identify and correct harmful element for safety culture

– to serve as company expert

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Safety Guardian Program

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- Organization chart

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– to distribute weekly nuclear safety culture message (every Thus day)

– to identify and correct harmful element for safety culture

– to serve as company expert

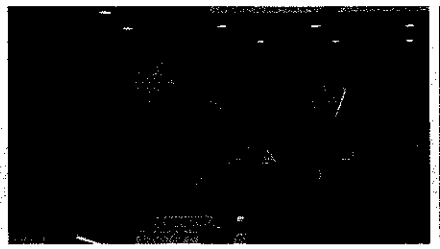
- Safety guardian award

Manager perspective(to be continued)

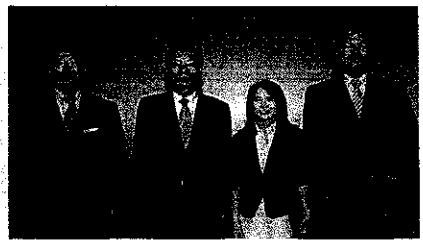
reward and penalty

- ❖ accident : HR 0100(HR management rule)
- ❖ others : day of nuclear safety(Gov. and KHNP), safety guardian(Gov.), best pilot award, best quality improvement award

[contribution to safety award]



[best pilot award]



[best quality improvement award]

Audit, Inspection, Comparison

- ❖ accident : audit 0100(audit position rule), management 0200(QA rule)
- ❖ others: PSA, PSR, SA, Safety inspection home and abroad, safety culture evaluation

Manager perspective(safety culture evaluation)

● 2010' Self Evaluation

Classification		Y2008	Y2009	Reference
participants	KHNP	2,695 persons (out of 3,680 subject to participation)	3,748 person (out of 3.982)	- to encourage all employees' participation - questionnaire participation by power generation devision
	contractor	-	2,110person (out of 2,694)	- participation in questionnaire by contractor (maintenance and radiation management firm)
Evaluation method		- self subscription via popup window at homepage - to select importance and satisfaction level on the range of 1-5 score		
Index calculation method		- give weight to satisfaction level and calculate it compared to 100 * 90 and over(very positive), between 70 and 89(positive)		

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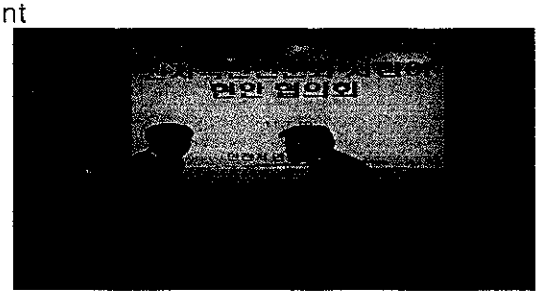
Safety Guardian Program

◆ Holding forum

– Time/Place: July.19.2011/ KHNP central research institute

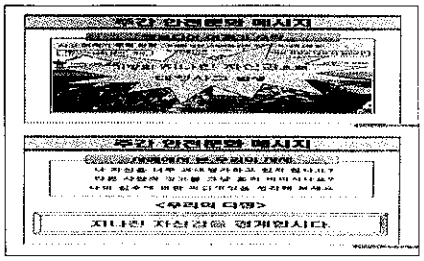
– Attendees: safety guardians from HQ and plants

– Contents: selection of safety guardian, lecture on presentation skill and how to develop document



◆ Sending out weekly safety message

– Implementation date: every Tuesday (first nuclear safety inspection day of every month is replaced by monthly safety message)



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실천형 안전문화 캠페인 전개

◆ Background

– Need for continuous emphasis on safety culture

– conduction of campaign to improve a safety mindset for all employees

◆ Campaign Activity

– Contest for safety culture poster and slogan('Oct.2011)

– Safety culture campaign per plant

· in the case of Nuclear power day(Dec.27) event, concurrent conduction

◆ HQ safety culture special lecture

– Time/place: HQ Hanbit hall (Sep.6.2011)

– Lecturer : Professor Jang Soon Hyung from KAIST

– Participants: HQ all employees(administration, civil engineering and construction)

KHNP

Monthly safety message

매월 "원자력안전점검의 날" 에 전직원(협력회사 포함) 교육

제65회 원자력 안전페시지

강력한 원자력 안전문화의 원칙

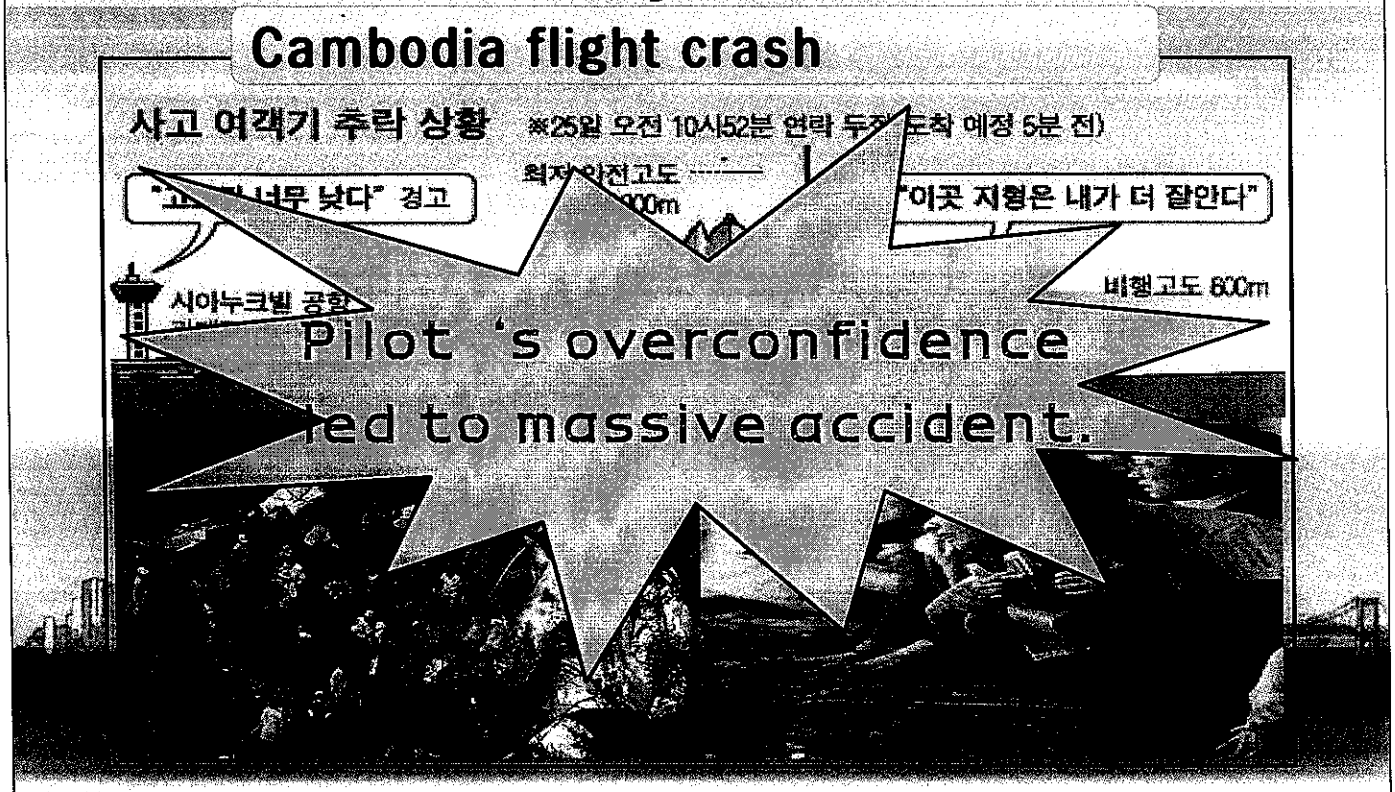
[*WANO GL 2006-02*]

2008. 7

안전기술처

Employee perspective weekly message on safety culture]

Cambodia flight crash



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Employee perspective weekly message on safety culture]

Our Attitude identified from cases

don' t' you overestimate yourself?

Don' t you dismiss others' warning?

Think about ramifications caused by your mistake.

<our pledges>

Let us not go overboard with overconfidence.

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Poster on Safety Culture

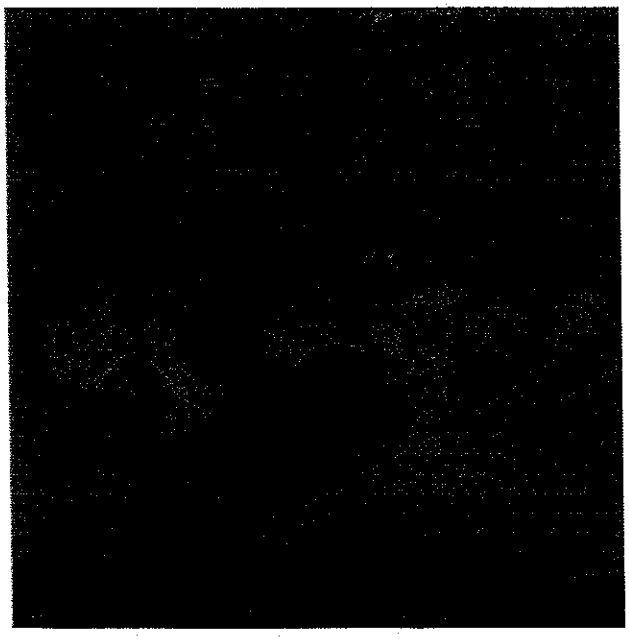
Cases of nuclear and other industries posted

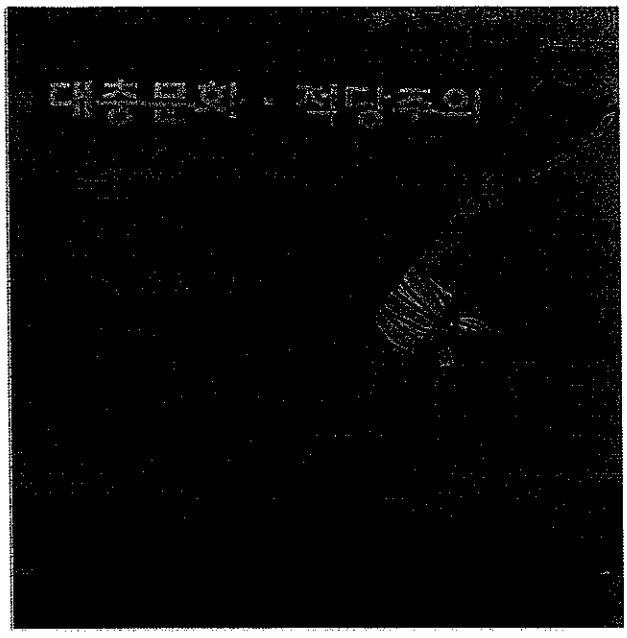
Poster on Human Error

Posters regarding experiences are made and emailed to all employees

Poster on Quality management

To enhance a quality mindset, new posters up on a weekly basis and emailed to all employees





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Employee perspective(to promote morale of MCR operators)

- **Best nuclear reactor pilot/team selection and reward**
  - Oversea benchmarking opportunity
  - Picture posted in MCR
  - Objective selection based on Operation capability improvement system

Introduction of power generation

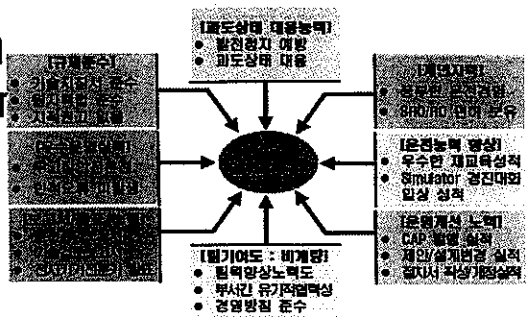
Assistant manager promotion system

- shift worker first(separate) promotion

- **Leadership training for power generation**

Assistant manager

- Included in company-wide leadership program



- Hosting contest for system/equipment expert teams – to improve ability of pilots

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Enhancing training program on safety culture

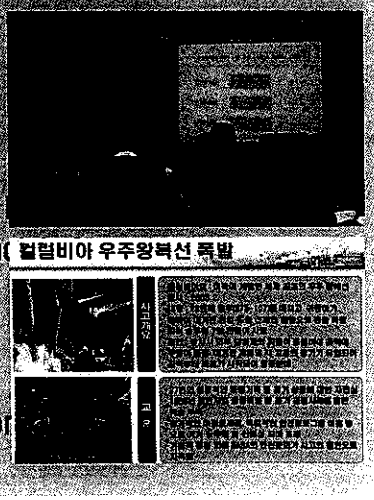
- Internalization of safety culture via training by KHNP and outside invited experts, more training opportunities with various topics to enhance safety

KHNP training

- For new hires : the importance of safety culture
- e-learning(2H) for all staffers: general safety culture
- Leadership course per position(1H) : action principle,
- All training(20M) : accident cases, safety culture prin(lectures
- Safety experts from regulators and aviation industry

To promote safety culture mindset via campaign

- Poster for safety culture, selection of exemplary wor



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Training Material on Safety Culture

- Background
  - Lack of Understanding on Safety Culture
  - Enhancing awareness of safety culture for KHNP and contractor staff
- Training Material under way
  - Adhoc Inspection by Department Education and Science on Safety Culture and its corrective action items(July, 2010)
- Development of Standard Curriculum
  - Two kinds developed(Aug,2011)
    - for planned MA: training provided 1-2 weeks before plant O/H
    - for contractors: training on safety culture
  - Standard Curriculum for Managers by Power Generation Department(Sep,2011)
  - Yearly Update

Measures for Systematic Improvement

- Background
  - a poor sense of importance on nuclear facility by nuclear power plant construction workers

  need for change of mindset in order to eliminate current and disorganized working routine by construction workers
- Plan
  - to hold seminars to promote safety culture in nuclear power industry (a total of three)
  - to promote real-name system for nuclear construction and construction evaluation system on critical facility

KHNP-Contractor Safety Forum

◆ Background

– Need to establish advanced safety culture in all nuclear safety industries.

– to share KHNP nuclear safety culture promotion experiences and how-how and cooperate for current agenda

◆ How to manage the forum

– Name: Korea Nuclear Safety Forum

– Purpose: to cooperate to handle agenda on nuclear safety and safety culture and take actions to correct the condition in the right time

– Composition: KHNP, design, manufacturing, construction, maintenance, research and other CEOs in the total of 14

– When: Yearly Regular Meeting, Steering Committee twice a year

– Establishment Date: Oct.19.2011

– Symposium: Oct.24-25.2011

Topic: Rules and tasks of Nuclear industry in order to secure nuclear safety

Development of KHNP Evaluation Guideline

◆ Background

– To identify nuclear related weak area via accurate evaluation on safety culture level for improvement

– Need to improve evaluation method per each area which developed for plant workers as current evaluation method

– To develop various evaluation guideline suitable for Korea

◆ Local and overseas Trend

– Local: Ministry of Education and Science conducted ad-hoc safety culture inspection(July,2010) and suggested the need of evaluation guideline

– Overseas:

· U.S. NRC Safety culture regulation inspection implementation system developed('06)

· IAEA safety culture evaluation guideline(SCART) developed('08)

※ current IAEA safety culture evaluation guideline(ASCOT Guideline) in use in Korea

Development of KHNP Evaluation Guideline

- Research Agenda Outline (under way)
  - Agenda: establishment of nuclear safety culture evaluation guideline
  - Time: Jan.2011-Dec.2011(12m)
  - Researcher : within KHNP
- Outline
  - to develop questionnaires suitable to KHNP and establish evaluation criteria
  - to complement procedure and conduct pilot program on safety culture evaluation
  - to produce measures to improve safety culture in the long term
- Expected Effects
  - to secure technology capability for self safety culture evaluation
  - to complete safe construction of nuclear power plant and contribute to operation management thanks to enhanced nuclear safety
  - enable individual evaluation per plant/department thanks to safety culture evaluation procedure

Process development for onsite application

- Current Status and Issues
  - Lack of specific onsite tool in order to enhance nuclear safety culture
  - Need to improve STAR method in MA compared to OP
- Development : 2011' TDR Agenda
- Contents
  - to develop criteria to diagnose onsite safety culture and utilize it for safety-related tasks
  - to improve Dreams notification process (inspection items for safety culture are added)
  - to revise procedure for manager observation(added is inspection procedure according to safety culture diagnosis criteria)
  - to improve safety culture observation system(for individual action observation and for manager observation)
  - to promote STAR campaign involving MA staff

※ STAR(Stop, Think, Action, Review) : one kind of SAs as part of human error prevention method

Others and Future Plan

- INPO TEV : from Sep.26.2011(Mon)to Sep.29.2011(Thursday)
- Contractor Training by Safety and Environment Department(from Jan.2012)
- E-Learning Contents Development and Mandatory Course on Safety Culture (from Jan.2012)
- Contractor Training on Safety Culture by Safety and Environment Department(from 2012)

2 Organization of Korea Hybrid & Nuclear Power for Nuclear Safety Management

□ [The Headquarters] 4 divisions, 16 teams (offices) [Branch] 5 divisions, 6 pumping-up electric power stations, 5 other offices

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Principle of Korea Hybrid & Nuclear Power for Nuclear Safety Culture

1. (Policy) Nuclear safety should be considered as the top priority in all works.

- ○ Nuclear safety statement or policy should be developed and its values should be shared.
- ○ Nuclear safety should be considered as the top priority in decision making process.
- ○ With acknowledgment on the specialty of nuclear technology, all works should be conducted in a careful manner.
- ○ In the process to develop plans for mid-and-long term equipment investment, resource allocation and business execution, an investment policy placing safety equipments on the top priority should be made.

2. (Management) The management should take a leading role in securing nuclear safety.

- ○ The management should exercise their capabilities in the management and mediation on pending issues for nuclear safety.
- ○ The management should make proactive participation in activities related to nuclear safety.
- ○ The management should be equipped with solid safety consciousness.
- ○ The management should facilitate horizontal and vertical communications on safety issues.

3. (Employees) All employees should take responsibility in nuclear safety and raise questions in their works.

- ○ The responsibilities in nuclear safety should be clearly stated by job level.
- ○ All employees should acknowledge the fact that responsibilities for nuclear safety lie on all of them.
- ○ All employees should abide by relevant regulations for nuclear safety in a strict manner.
- ○ All employees should have ownership in their works.
- ○ All employees should execute their works with a mindset raising questions.

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4. (Environment) Working conditions caring safety should be established.

- Candid and open organization culture should be established.
- High level of mutual trust should be ensured in the organization.
- Efficient work process should be established to enhance nuclear safety.
- Reasonable welfare and HR system should be developed to boost morale of employees.
- An appropriate system to raise employees' pride of the company should be made.
- Work stress should be managed at an appropriate level.

5. (Training) Constant learning and improvement behaviors should be facilitated within the organization.

- Safety leadership education customized to the development level of individual employee should be ensured.
- Operation experiences at home and abroad are reviewed and utilized in a timely manner.
- Adequate job training by area is under execution.
- Constant work improvement activities are unfolding.

6. (Management) Effective review and evaluation on safety should be executed in a sustainable manner.

- Evaluation and following utilization of evaluation outcome are under execution in an effective manner.
- Change management for facilities, procedures and organizations is proceeded appropriately.
- Safety performance index is constantly traced and managed in a sustainable manner.

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SAFETY CULTURE ASSESSMENT METHOD by JANTI

2011.11.15

JANTI
Safety Culture Division

【Interview Data Analysis Method】

a. Personal Files

The personal interview result is input into the table of the Excel sheet.

JANTI 7 principles classification, interviewee name, section, job specifications, official post and rank, interviewer name, analyst name are input into an Excel input sheet every interview question item. These input at the time of the analysis of interview data to utilize a filter function of the Excel.

Q No.	Question	Results	+・O・—	Interviewee Name	JANTI 7 principle	TEAM Name	Interview order	Section	Job specifications	Job Position	Interviewer Name	Analyst Name

The individual hearing results divide it into three depending on the contents and are separated an input letter by color. Specifically, the positive opinion is a blue letter, and the neutral opinion is a black letter, and the negative opinion is a red letter. In addition, this personal file is for analyses and does not disclose it in an interviewee establishment (because it is revealed who talked about what).

In addition, refer to attached sheet -5 for 3 divisions.

b. Making of the Analytical File

We collect the Excel input sheet that input all the personal files (30 sheets or 42 sheets) all together and make an analytical file.

The assessor making a report then checks about the answer of a positive, neutral, and negative opinion that a member of each analyst was decided at the onsite diagnosis, and confirms three classifications about a personal opinion provided by an interview.

And we finally give "-"sign to a negative answer with "0" sign for a neutral answer for a positive answer in "+" sign.

In addition, we move it to a question to fit when it is thought that the opinion obtained from a certain question item is the answer to other items.

We do not disclose this analysis file either.

c. Making of the attachment file

From an analysis file, we gather up the opinion of six interviewees in every section which we collected by onsite interview using the filter function of the Excel sheet along 7 JANTI safety culture principles in every sections. Because 7 principles of JANTI consist of the some questions, we gather a provided opinion every question. We arrange the opinion that was collected here in order of a positive answer (blue letter), a neutral answer (black letter), a negative answer (red letter). (cf. attached sheet -6)

We make an attachment document using analysis file and report it to a target site.

d. Summary of a result

In reference to an attachment file, we summarize the positive opinion and a negative opinion that is a major opinion in every section along JANTI 7 principles. A major opinion is opinions obtained from the majority (more than three interviewees) of the section (Cf. table 1 of attached sheet -7). In the report, we arrange the major opinion every section which gathered it here like attached sheet -8 every 7 JANTI principles.

In addition, in the negative opinions that were not recognized as the major opinion, we gather negative opinion, as the "minority negative opinion" to become important in fostering activity for safety culture in every section. (Cf. table 2 of attached sheet -7)

As the instructions of the majority negative opinions and the minority negative opinions taken up as above, we make them rearranging and structuring in JANTI safety culture 7 principles. And we arrange them in the viewpoint of derivation problem (the problem that can be settled on the site) and the root problem (problem becoming the prime cause of the issue of derivation).

And, we exemplify a countermeasure for a problem and examine a hint of the solution to site in a direction to show. In awareness (instruction), we make the example of the countermeasure a table as a hint.

The example of the countermeasure helps a target site.

The example of these countermeasures is simply reference. (Cf. table 3 of attached sheet -7)

Furthermore, we report it in addition if there is a specific good example (good practice) depending on a countermeasure.

attached sheet－5

Judgment example of a positive opinion and a negative opinion

This shows that the judgment example about the positive, negative and neutral classification examples of each opinion by the experience of the past onsite diagnosis.

Red letter : About item concerned, the opinion is negative, or means recognition of negative problem.

Black letter : neither positive or negative opinions (Comment, Briefing)

Blue letter : About item concerned, the opinion is positive, or means positive contribution.

Note)
the opinions of interview in every element of every each principle are classified positive, negative and neutral(others) opinions about a tendency of an action and the attitude.

【Example】

2. observance of the rule (Principle 3)

(attribute)
The organization makes a rule known to an employee including a subsidiary companies. The employee observes a rule after having understood the bases of the rule. In addition, the organization instructs the rule observance and maintains system to check.

(Interview contents : question)
Is the rule of the safety followed in the workplace?
Do you find that a rule is not followed on the site?
In that case, what do you do for you?

(Positive answer example)

- The rule about the safety is followed, and there is not the thing that a funny action stands out intentionally.
- The person who noticed that a rule is not followed warns. Observance of the rule is careful in the employees of other sections and subsidiary companies each other.
- Various rules including the knowledge of the labor safety are followed.
- I observe a rule myself.
- Naturally it has an atmosphere to be careful for violation of rule.

(Negative answer example)

- The slight violation of a rule is occasionally found, such as, the notice that there should be is not displayed appropriately.
- A rule is followed consciously, but when I do not know it and forget it or I was careless, I may not follow a rule.
- Because procedure books and manuals become complicated, I do not understand a rule or do not know a rule and cannot follow the rule.
- There is the person who does not understand a manual enough.

(Neutral answer example)

- I think that the rule is followed basically. (a guess, vague)
- I think that the person of the subsidiary companies follows a rule to protect one's body. (a guess, expectation)
- I do not break a rule intentionally. (naturally what you should follow)

8. 2 Summary of the onsite diagnosis result(example)

8. 2. 1 Majority answer

【 Case of Principle 1 】

The value of safety as the top priority is thoroughly clarified within the organization and understood by each of the organizational members.

FACTOR	Maintenance Electricity	Maintenance Machine	Maintenance Instrumentation	Operation (support)	Operation (direct)
【1. Organizational governance】					
【2. Management of resources】			■	■	
【3. Communication between headquarters and power site of organizations】		E			

「Positive Majority Answer (Opinions)」

◆ Summary of the whole site on positive majority opinions
○○○○○○○○○○○○○○○○、○○○○○○○○○○○○○○○○.○○○○○○○○○○○○○○○○、○○○○○○○○○○○○○○○○. The personnel evaluation is proper。

「Negative Majority Answer (Opinions)」

◆ Summary of the whole site on negative majority opinions
In some section,○○○○○○○○○○○○○○○○○○○○○○○○、○○○○○○○○○、○○○○○○○○. ○○○○○○○○○○○○○○○○○○○○、○○○○○○○○○○○○.○○○○○○○○○○○○.

Note 1)

	Positive majority opinions about factor in every sections
■	Negative majority opinions about factor in every sections
E	Positive opinions and negative opinions are equal
	Other than the above (in the case of few answers)

Note 2)

In the case the number of the answers (a negative and a positive total) is more than six, we decide a majority opinion more than the majority.

And, in the case a negative and a positive opinions are equal, we decide equivalent. There is not majority opinion

In the case the number of the answers is three or more, all opinions without neutral are same classification, we decide majority opinion.

In addition, it is based on the answer of six people of interviewee by the diagnosis in all sections.

【Case of Principle 2】

The leaders of the organization impose an obligation to commit to safety and clarify it through leadership..

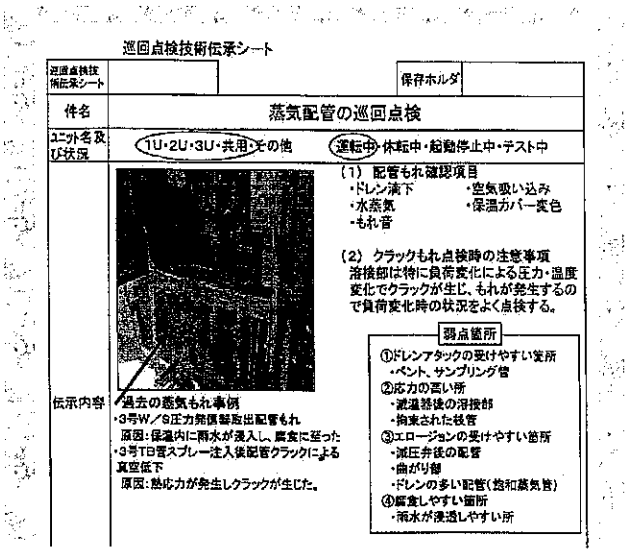
FACTOR	Maintenance Electricity	Maintenance Machine	Maintenance Instrumentation	Operation (support)	Operation (direct)
【1. Leadership】					
【2. commitment】					
【3. respect of to safety policy】					

「Positive Majority Answer (Opinions)」

◆ ○○○○○○○○○○○○○○○○、○○○○○○○○○○○○○○○○. ○○○○○○○○○○○○○○○○、○○○○○○○○○○○○○○○○. ○○○○○○、○○○○○○○○○○○○○○○○.

(same as follows)

【Example of Good Practice】
(in Japanese)

対応策　No. 7 (Countermeasure No. 7)	
◈ 気付点 (Awareness)	新人を教える若手中間層が不足していること、ベテランと一緒に作業をすることがなくなったことなどによる技術伝承への不安
★ ヒントの内容 (Contents)	新人や若手を教える層が少ない状況は、類似の事業所でも見られるものである。伝承する側のエキスパートにシニアやＯＢを活用しマンツーマンで教育・指導する方法もある。このような状況下では、共有できる技術を教育・訓練システムの中に組み入れ、その際、効率的に熟練者を活用することも考えられる。近年では、技術伝承を目的として、実物や模型を使い実体験を通じて技術・技能を身に付けさせる教育訓練施設を備える事業者もある。
◇ 具体例 (Specific Example)	(1) 某発電所では若手社員とエキスパートを共にパトロールに出し、以下のようなレポートを作成させ、技術伝承している。このレポートは若手勉強会で相互に紹介され、技量向上に役立てている。  巡回点検技術伝承シート 巡回点検技術伝承シート 保存ホルダ 件名：蒸気配管の巡回点検 ユニット名及び状況：1U・2U・3U・共用・その他　運転中・休転中・起動停止中・テスト中 (1) 配管もれ確認項目 ・ドレン滴下　・空気吸い込み ・水蒸気　・保温ガバー変色 ・もれ音 (2) クラックもれ点検時の注意事項 溶接部は特に負荷変化による圧力・温度変化でクラックが生じ、もれが発生するので負荷変化時の状況をよく点検する。 弱点箇所 ①ドレンアタックの受けやすい箇所 ・ベント、サンプリング管 ②応力の高い所 ・減温器後の溶接部 ・拘束された枝管 ③エロージョンの受けやすい箇所 ・減圧弁後の配管 ・曲がり部 ・ドレンの多い配管(飽和蒸気管) ④腐食しやすい箇所 ・雨水が浸透しやすい所 伝示内容 ・過去の蒸気もれ事例 ・3号W／B圧力開閉器取出配管もれ 原因：保温内に雨水が浸入し、腐食に至った ・3号TB雲スプレー注入後配管クラックによる真空低下 原因：熱応力が発生しクラックが生じた。 (2) 某航空機エンジンの点検事業所では、リタイアしたＯＢに週２～３日、事業所に来てもらい、中堅技術者の技量向上のため、マンツーマンで点検技術の指導を行っている。 (3) 某発電所では、ベテラン社員が保有する建設、設計ノウハウ及びトラブル経験の伝承を目的に、トラブル対応に直接携わった経験のある人（社員ＯＢを含む）を講師として招き、受講者が討論して考えるゼミ形式の教育（「事

	例研修」）が2001年1月から実施され、現在１つの課あたり年間20回程度オフ定検時に実施されており、過去のトラブルにより得た知見、ノウハウの確実な伝承が行われている。（JANTI事例） (4)某発電所では、設備等の異常の早期発見能力を養う観点から、「役職者同行パトロール」や「気づき能力向上訓練」を若手発電所員の現場技術力の向上に役立っている。前者は、経験豊富な役職者が若手の発電所員(保修部門、発電部門)に、設備の技術的な知見や異常発見のポイントを指導するものである。後者は、研修センターの設備を使って、模擬された不具合を訓練生がどう気づき、どう対応するかを訓練するものである。（JANTI事例）

JANTI's Promotion of Nuclear Safety Culture (introduction)

14-16 , Nov., 2011

Takuya Fukano
Safety Culture Division
JANTI

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《1》

Table of Contents

- View of JANTI's Promotion of Safety Culture
  ~Knowledge, Awareness to Action~
- JANTI's Activities to Foster Safety Culture
  -How realize the state in which safety culture is fostered?-

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《2》

View of JANTI's Promotion of Safety Culture

～Knowledge, Awareness to Action～

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《3》

Mission of NS Net Division

To supports member's activities so that

- all members share values; "safety is an overriding priority",

- all members encourage each other.

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《4》

JANTI's Promotion of Safety Culture

- one of **the Most Important Activities** of JANTI
- by **"Peer Review"** and **"Safety Culture Fostering"**
- **"Safety Culture Fostering"**
  systematically promoted
  "Recognition of the gap" between fostered State of Safety Culture and Current Situation"
  " Reduction of the gap"

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《5》

Safety Culture Developments in Japan

- **1999: JCO accident**
  Emphasis placed on safety culture ⇒ establishment of NS networks
- **2002: Irregularities in self-inspection records by Tokyo EPCO**
  Made quality assurance activities subject to safety inspections
- **2004: Pipe ruptures at Kansai EPCO's Mihama Unit 3**
- **2005: Interim report by the Facility Obsolescence Review Panel**
  Potential for corporate cultures and organizational climates to deteriorate along with aging facilities ⇒ regulatory side verifies operator's independent activities to prevent declines in safety culture
- **2007: Comprehensive inspections of power plants find widespread falsifications of incident reports and data**

- **Use regulations to proactively intervene in safety culture**
  Safety inspections evaluate operator efforts to foster a safety consciousness and look for signs of worsening safety culture

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《6》

Recent Safety Culture Developments

- Nearly 3 years have passed since active regulatory intervention in safety culture began within the safety inspection framework
- Power utilities have created PDCA mechanisms for their independent activities and those mechanisms are now in operation
- Recent comments from the regulator side:
  - Clear distinction between safety culture activities and QMS
  - Establishment of a methodology to gauge the effectiveness of activities fostering safety culture
  - Elimination of discrepancies between power utilities in PI settings and other indicators connected to activities fostering safety culture
  - Request for more active information-sharing between power utilities

Although framework activities are just getting underway, a key point to watch is effectiveness evaluations of activities in the Check and Act stages of the PDCA cycle

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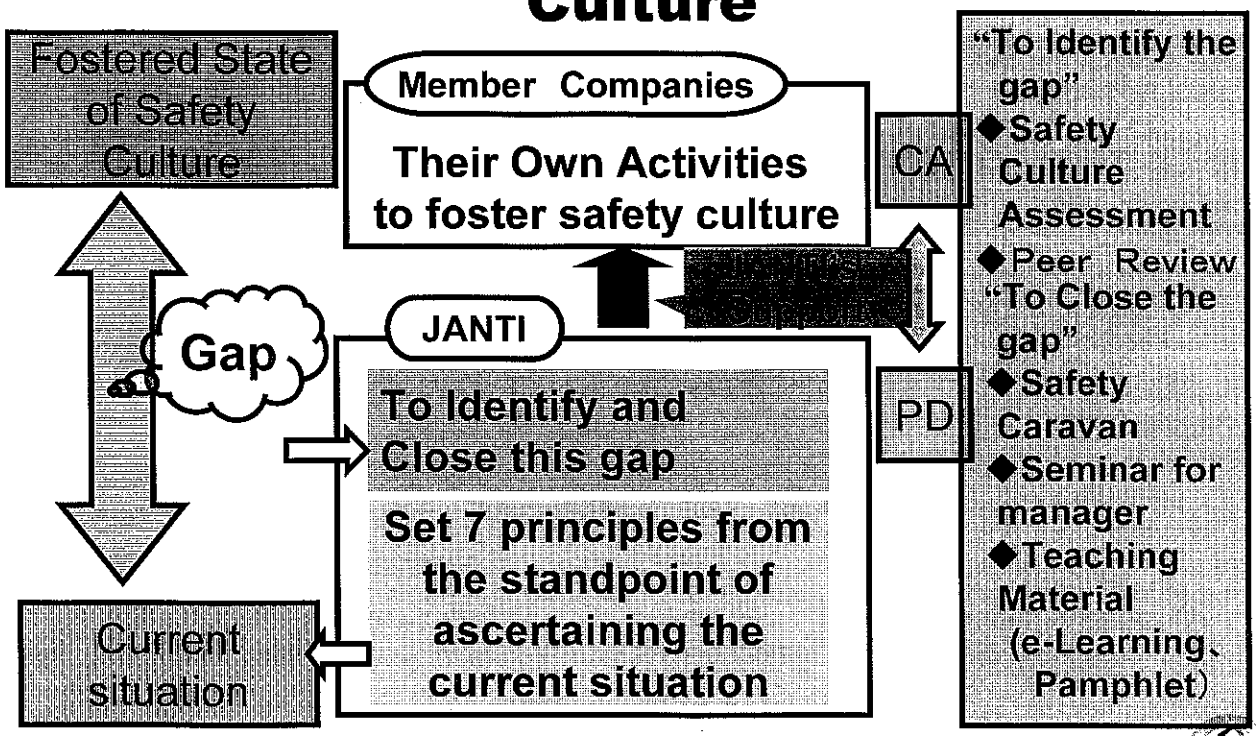
《7》

JANTI's Activities to Foster Safety Culture



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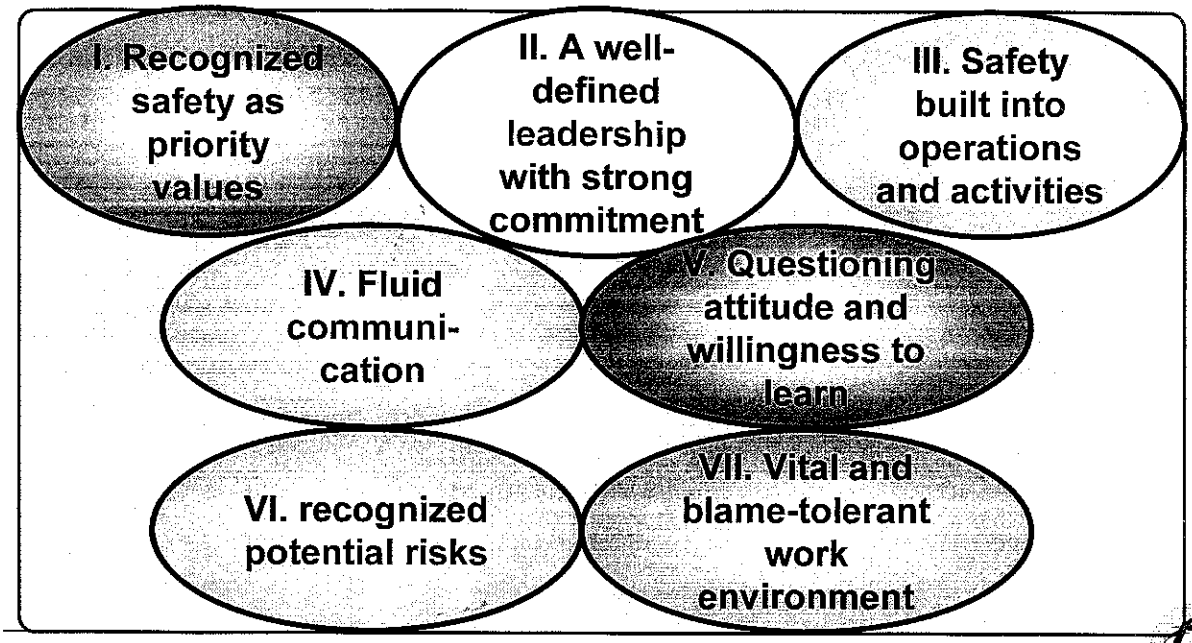
《8》

JANTI's 7 Principles

"The state in which all members of the organization share values that safety is an overriding priority,
these values are recognized throughout the organization, and behaviors are based on this common recognition."



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Compatible Relation between 7 Principles by JANTI and 8 Principles by WANO

7 Principles by JANTI		8 principles by WANO
1.Recognized safety as priority values	⟺	1.Eyeryone is personally responsible for nuclear safety
2.A well-defined leadership with strong commitment	⟺	2.Leaders demonstrate a commitment to safety
3.Safety built into operations and activities	⟺	4.Decision-making reflects safety first
7.Vital and blame-tolerant work environment	⟺	8.Nuclear safety undergoes constant examination
4.Fluid communication	⟺	3.Trust permeates the organization
5.Questioning attitude and willingness to learn	⟺	6.Questioning attitude is cultivated
		7.Organizational leaning is embraced
6.Recognized potential risks	⟺	5.Nuclear technology is recognized as special and unique

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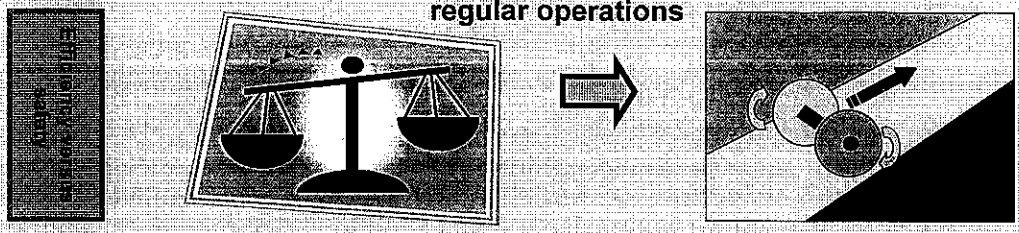
《10》

Key Perspectives on Safety Culture (1/4)

1. Shared values throughout the organization

The value that "safety is the overriding priority" is shared at all levels (top executives, middle managers, and line managers)

Safety assurance is the underlying framework for the smooth advancement of regular operations



- **The public (and the media) is taking an ever-more critical eye to our industry. The media will vilify any operator, regardless of its status, over even a single accident. It takes an enormous amount of time to win back the public's trust. Operations may even be suspended.**
- **Negative information from all sides will be conveyed directly outside the organization, due to the permeation of the Internet and the institutionalization of whistle-blowing.**
- **With the collapse of the lifetime employment system, workers' identification with their organizations has changed.**

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《11》

Key Perspectives on Safety Culture (2/4)

2. Commitment at all levels (responsibility and involvement)

- Top executives must champion a clear ideology and policy on safety, gauge the level of understanding and awareness of the ideology and policy, and make necessary revisions and improve dissemination approaches.
- Middle managers must get line managers to recognize the necessity to rank operations and to clarify roles and responsibilities; arrange mechanisms that incorporate safety activities into routine operations and that enhance systems to compensate workers for proactive activities; and build a workplace atmosphere that allows workers to speak freely.
- Line managers must be aware that the most substantial part of safety assurance is up to them and that pursuing safety is everyone's job, insist on report-contact-consult cycles even when they include negative information, and make forward-thinking suggestions for safety improvements. Line managers must pay attention to prevent conformity ("not thinking for oneself") and cutting corners ("someone else will do it").

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《12》

Key Perspectives on Safety Culture (3/4)

3. Communication (mutual understanding)

- The essence of communication is managers and subordinates recognizing their relationships and taking an interest in each other, and workplace personnel having a feeling of solidarity toward their work and confirming the progress and results of their work with each other.
  → Workplace atmosphere and appropriate authority gradients conducive to speaking up
- It is very important to have a climate that commends people who bring up negative information; additionally, appropriate methods of commending and censuring must be devised.
  → Exemptions from discipline for human errors and unintentional violations
- Line managers must endeavor to enlighten themselves by creating an atmosphere that gets the most out leaders (study the importance of "followership" and practice followership).
  → Imagine yourself in the other person's shoes
- Veterans must see that they have an obligation to hand down techniques and skills to newer workers, and newer workers must devote themselves to absorbing the techniques and skills of veterans and becoming self-reliant as soon as possible.

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《13》

Key Perspectives on Safety Culture (4/4)

4. Providing incentive and motivation

- Middle managers cannot assume that everything is going well. They must take an interest in their subordinates and frequently convey the message that their focus is on their subordinates' routine activities. Middle managers must take a grateful and encouraging stance toward their subordinates' work by often visiting the workplace and speaking directly with them to ensure conformity.

5. Questioning attitude (sensitivity to risks)

- Workers must hone their sensitivity to occurrences that are out of the ordinary (feel unsafe) and have the confidence to suspend or stop operations when they sense or encounter an unusual situation.
- Workers are aware of the changes to risks over time. They act in consideration of the advantages of risk-taking versus the disadvantages of not taking risks.

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《14》

JANTI's Activities to Foster Safety Culture

-How realize the state in which safety culture is fostered?-

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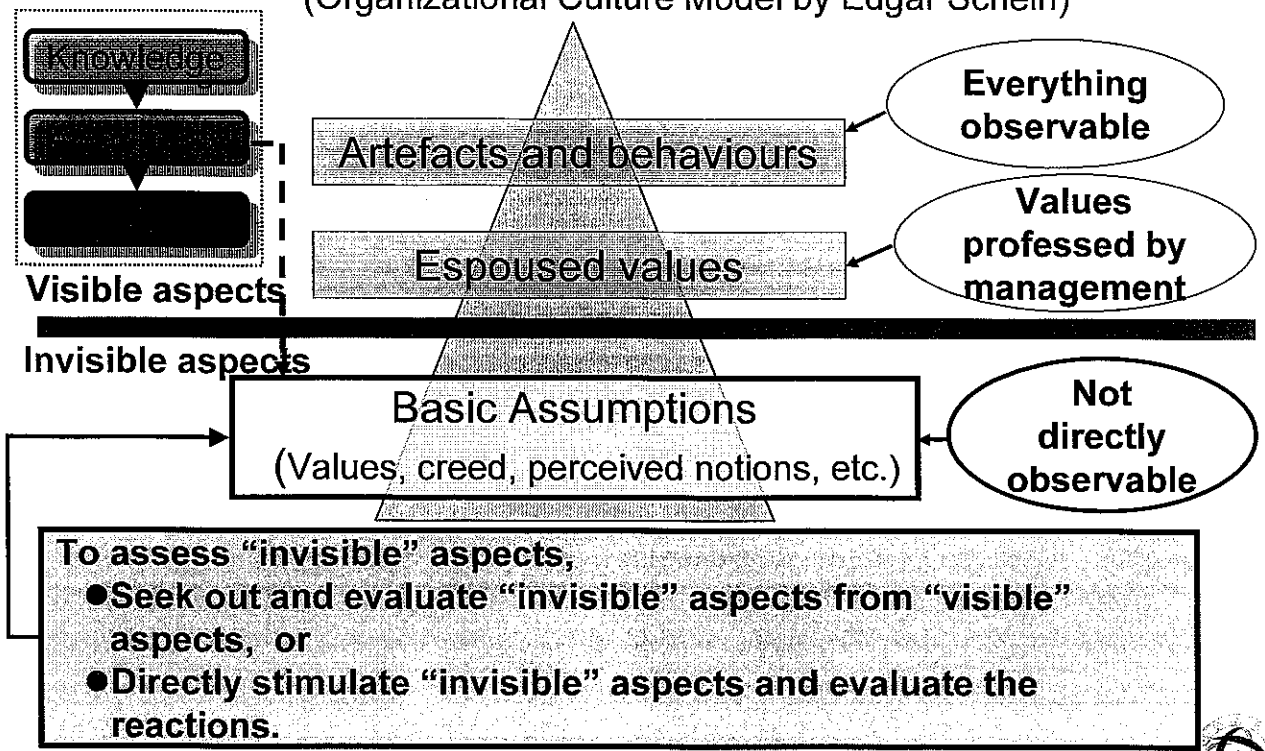
《15》

To Identify the Gap(1/3) : Safety Culture Assessment

(Organizational Culture Model by Edgar Schein)



To assess "invisible" aspects,
- **Seek out and evaluate "invisible" aspects from "visible" aspects, or**
- **Directly stimulate "invisible" aspects and evaluate the reactions.**

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《16》

To Identify the Gap(2/3) : Overview of Safety Culture Assessments

To Conduct questionnaire survey on safety culture

About 14,000 employees at or below manager level through nuclear industries

↓

To Conduct onsite diagnosis

30-42 employees at or below assistant manager level

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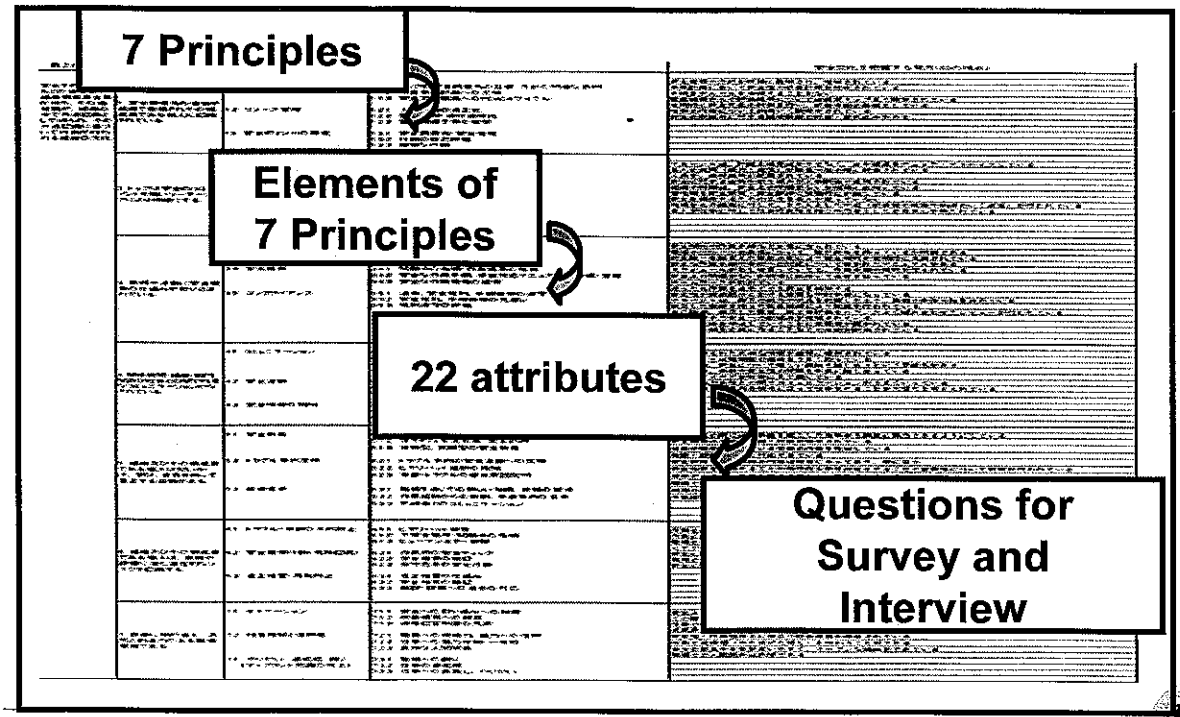
《17》

To Identify the Gap(3/3) : Structure for the Survey & interview



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To Close the Gap(1/5)
- Safety Caravan –
(held 125th as of Nov.,2011)

100th Safety Caravan (2007/11 Ikata NPS)

Lecture by Ph. Yoshida

•Safety Lecture by Specialist

Information exchange meeting

•Information Exchange with plant managers

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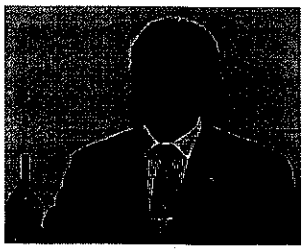
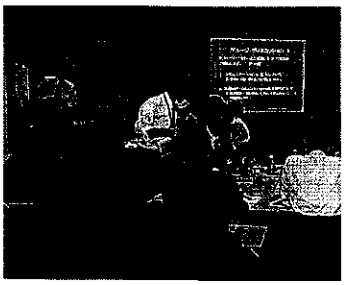
To Close the Gap(2/5)
- Seminar for Manager -
(held 22th as of Mar.,2011)

<CRM Workshop>



Mr.Ishibashi (tohoku Uni.)



Group discussion

<Safety Culture Workshop>

Ph.Yoshida(kumamoto Uni.)

Group discussion

Hands-on training for railways emergency
JR East Training Center

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《20》

To Close the Gap（3/5）
- e-Learning –

（About 44,000 accesses as of Mar.,2010）

	Title	Start Date
1st	You are a leader of Safety Culture	Apr. 2007
2nd	Make use human factor for Job	Apr. 2008
3rd	Fundamentals of Risk Management	Apr. 2009
4rd	Practices of Risk Management	Apr. 2010

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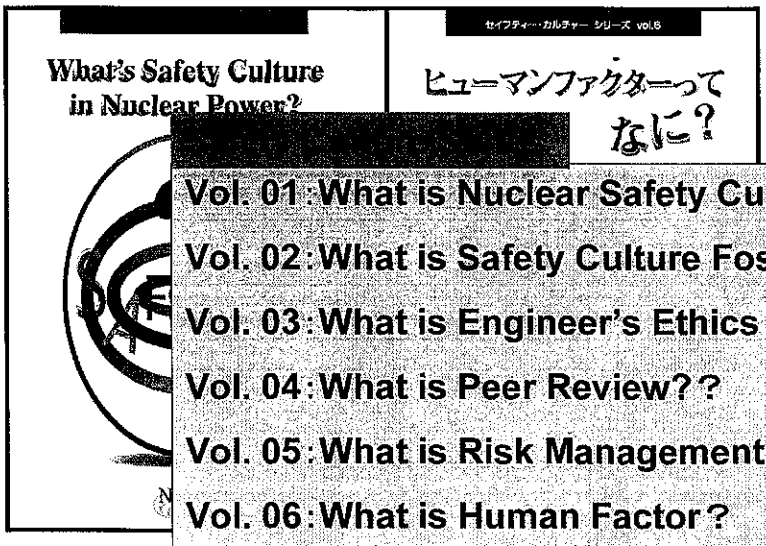
《21》

To Close the Gap（4/5）
-Pamphlet-

((ex.)Vol.7 are Published
about 10,000 as of Feb.,2010)



Vol. 01：What is Nuclear Safety Culture?
Vol. 02：What is Safety Culture Fostering?
Vol. 03：What is Engineer's Ethics and Company Ethics?
Vol. 04：What is Peer Review?？
Vol. 05：What is Risk Management？
Vol. 06：What is Human Factor？
Vol. 07：What is Nuclear Safety Culture (2)?

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《22》

To Close the Gap (5/5)-1
-Poster-

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《23》

To Close the Gap (5/5)-2
Meaning of One Character on the Poster

- 1st : "Show the flag of the safety as the top priority".
- 2nd : "Executive displays strong leadership".
- 3rd : "Build up the system and foundation of the safety".
- 4th : "Comply with and understand other person".
- 5th : "Observe well, ask and learn".
- 6th : "Recognize potential risk".
- 7th : "Open mind and speak freely".

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Be Aggressive For Safety

Th you

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《0》

SC Benchmarking with INPO

Overview to Understand of assessment and improving Safety Culture

14-16 , Nov., 2011

Takuya Fukano
Safety Culture Division
JANTI

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《1》

Table of Contents

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《2》

About JANTI's Safety Culture Assessment

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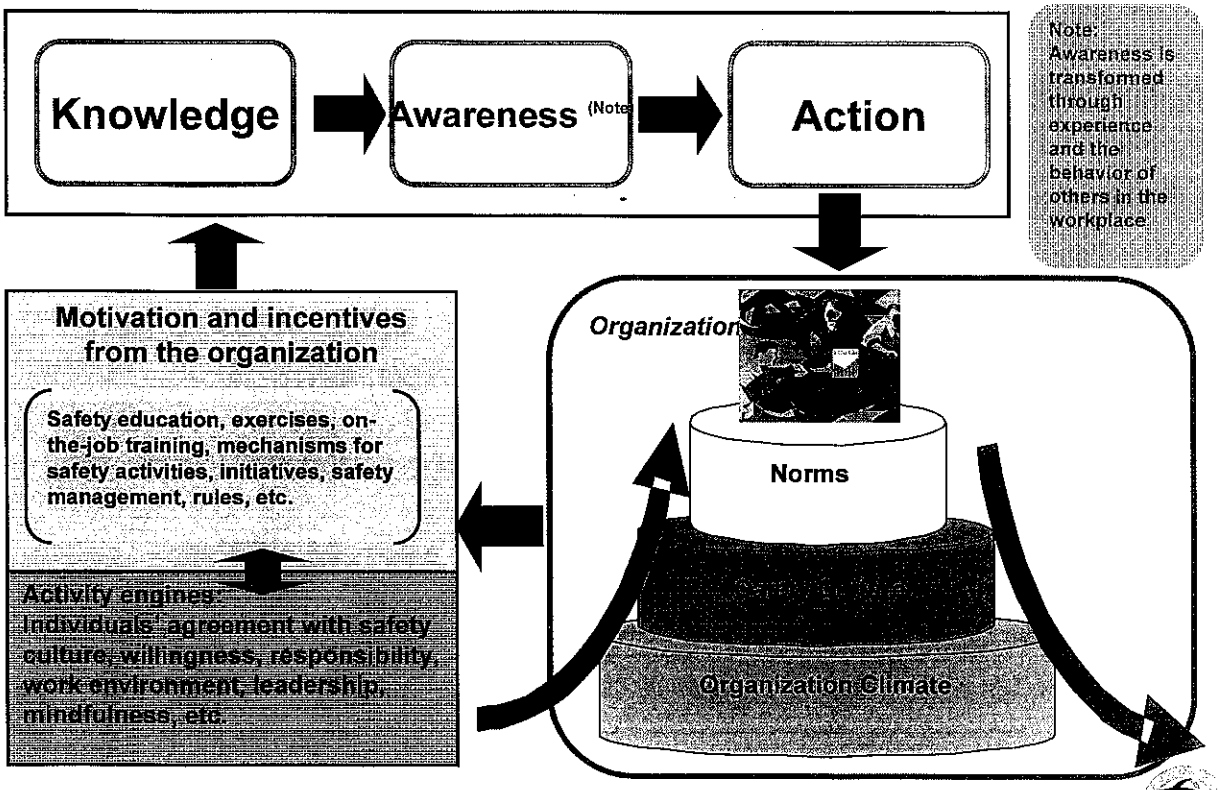
《3》

Foundation of Activities to Foster a Safety Culture



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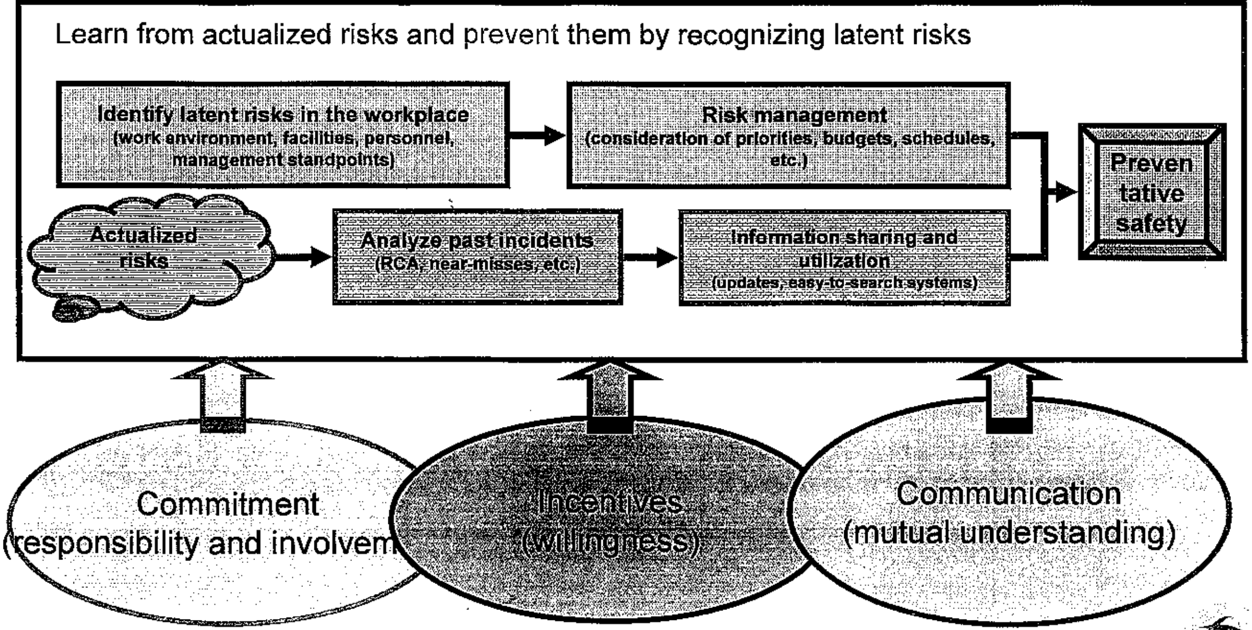
《4》

Points for Safety Activities / Initiatives

Convince the rank-and-file to routinely identify risks (symptoms of a deteriorating safety culture) and take countermeasures (reduce or eliminate the risks)



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《5》

Overview of Safety Culture Assessments

Safety Culture Assessment

Top concepts for safety culture assessments
* **Define the state in which safety culture is fully fostered**
* **Establish the seven safety culture principles**

↓

Conduct questionnaire survey on safety culture 322回/総計 14000人 97% response For nuclear plant
(Prepare Questionnaire Sheet, Conduct, Analyze and Conclude)

↓

Conduct onsite diagnosis (mainly conducted through onsite interviews after analyzing results of safety culture self-assessments, recent several trends of PI, incident data, and results of peer reviews, root cause analysis etc.,)
Analyze and assess results

↓

Submit report (and follow up)

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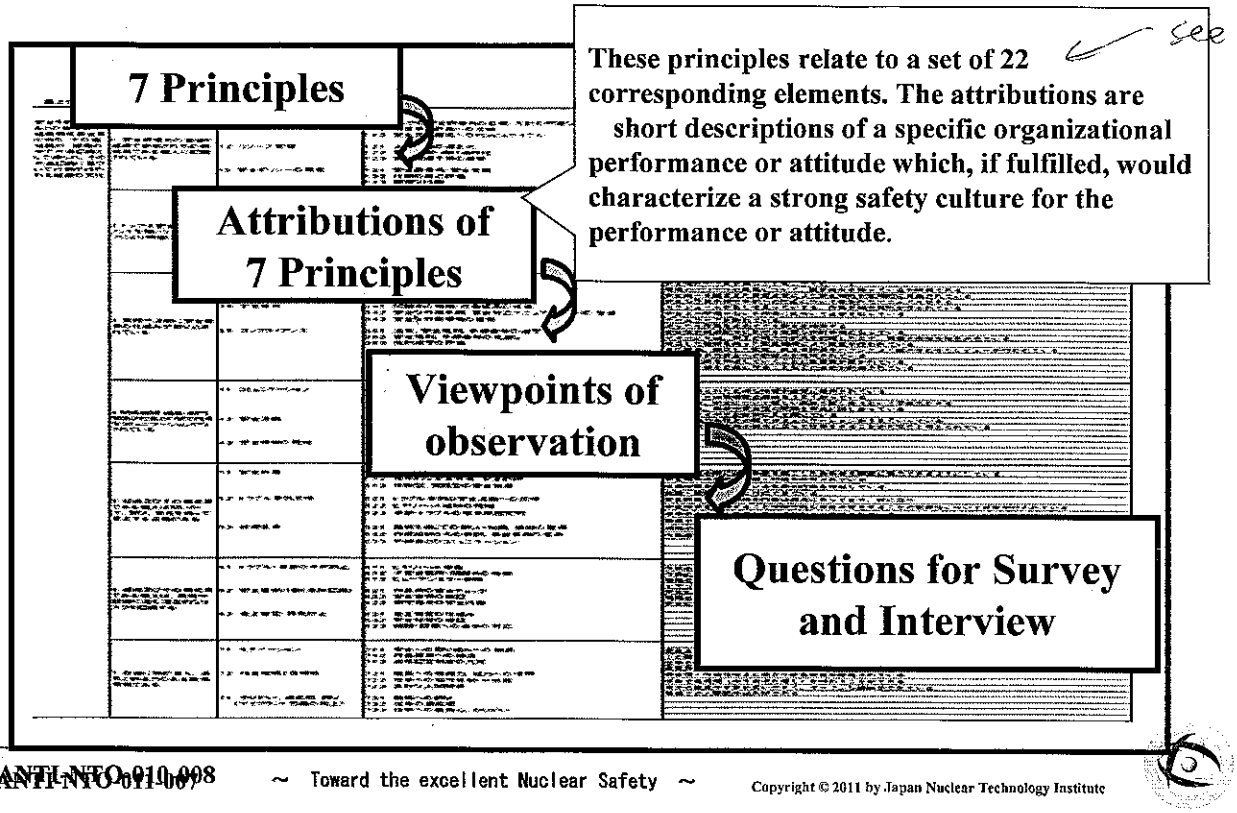
《6》

Structure for the Survey & Interview



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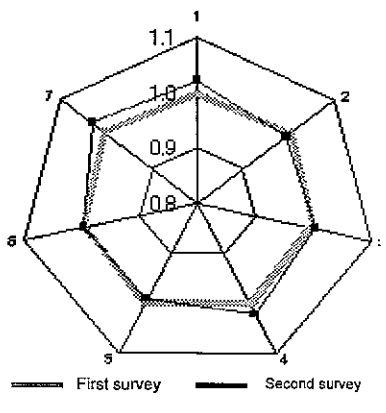
《7》

Safety Culture Questionnaire Survey

By means of questionnaire survey
- **Show the relative situation among utilities and the comparison among areas based on the many opinions about the safety and statistic analysis.**
- **Identify the trend by repetition of questionnaire.**

Consequently
- **Identify the area to be enforced later**
- **Focus on the object of onsite diagnosis**



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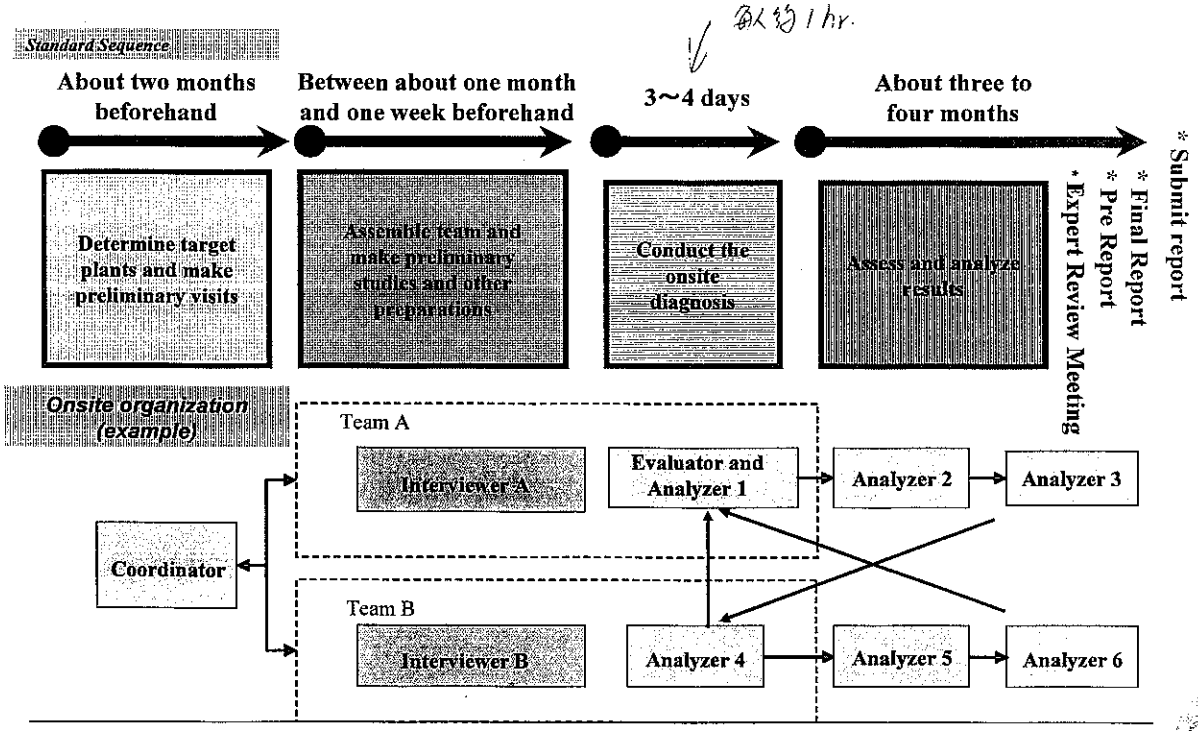
《8》

Standard Onsite Diagnosis Sequence and Team Formation



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《9》

Safety Culture Onsite Diagnosis Method

- Consists of interviews with employees at or below assistant manager level
- Participation of experts makes JANTI's onsite diagnostic methods more transparent and specialized
- Interviewee
  -> generally about 30-42 people , but this is decided after accounting for the number of plant personnel, its organizational structure, and the achievements of the questionnaire takers
- Interviews are carried on for about 3-4 days, with each individual interview lasting about one hour
- Objects are the maintenance and operation (manufacture) including the demanded area of all member
- Extent to the fuel facility which is regulated like power utility

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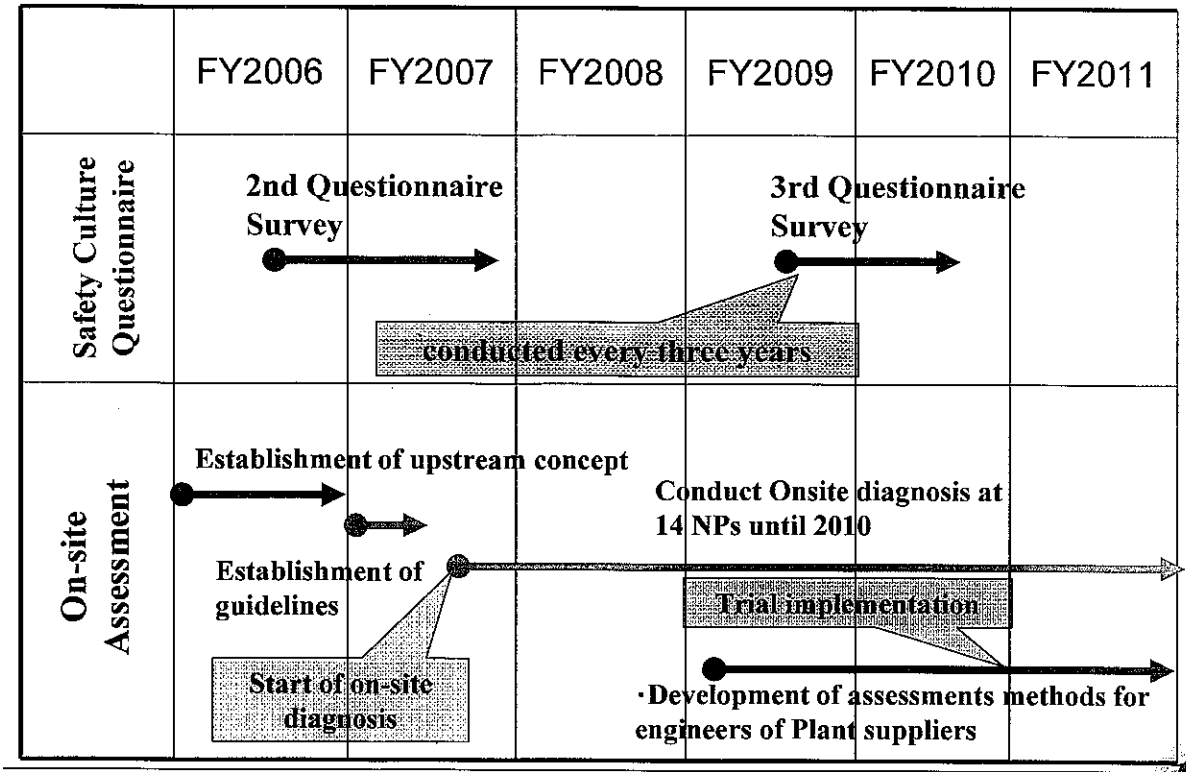
《10》History of Safety Culture Assessment



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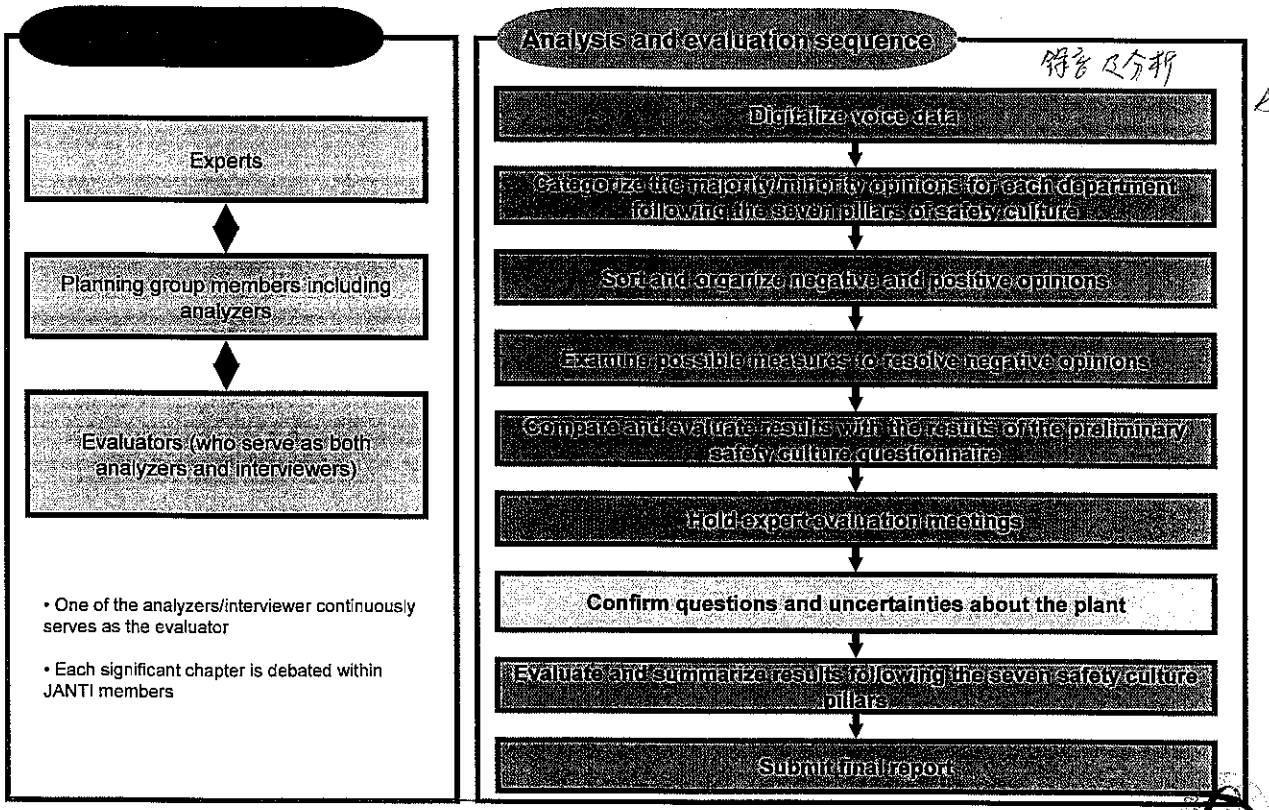
《11》 Evaluations of Onsite Diagnoses



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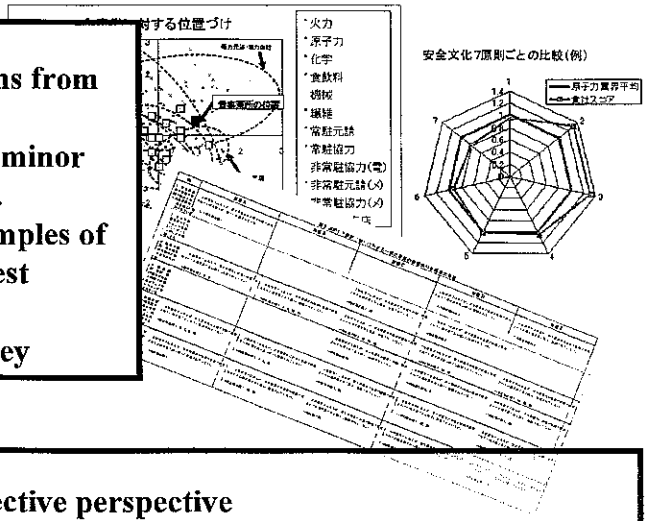
《12》

Outputs and Benefits of Onsite Diagnosis

Outputs

- Summary of positive and negative opinions from major opinions
- Summary of only negative opinions from minor opinions because of a potential risk of its.
- For negative opinions, suggestions of examples of countermeasures and other operators' best practices
- Comparisons with the questionnaire survey



Expected Benefits

- Provides outside assessment from an objective perspective
- From the 7 principles, ascertains awareness levels and the inherent circumstances at the plant, indicates countermeasures and best practices for members own initiatives
- Confirms the presence of any biases in the questionnaire survey and picks out minority opinions that are difficult to perceive in the questionnaire survey
- Lends correspondence strategies for power utilities member to use in safety culture efforts under safety regulations

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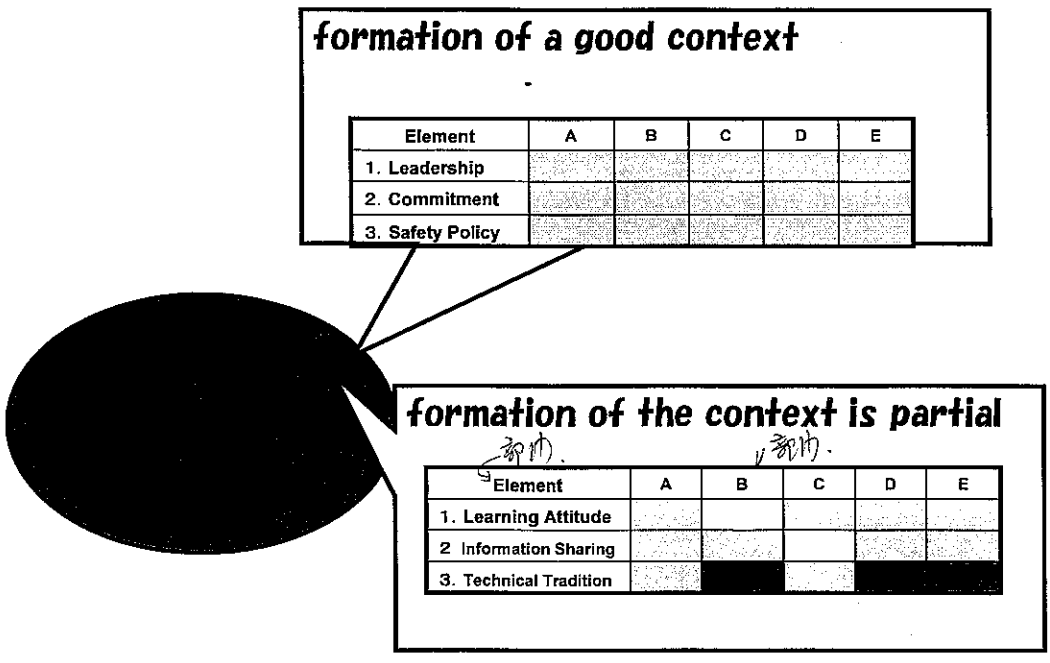
Image of Analytical Results



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Contents of Safety Culture Assessment (SCA) report

- Abstract of the Report
- Implementation of SCA (schedule, framework, method, team member etc,.)
- analyzed Result of questionnaire
- analyzed Result of diagnosis
- Comparison between the result of questionnaire and diagnosis
- Comparison with self-assessment and another NPs
- Conclusion (result of examination)
- Presentation of example for resolution

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Merits of Safety Culture Assessment

- **To identify the information which is difficult for the executives to recognize through middle manager.**
- **To pick out minority opinions**
- **The basic data for planning of safety culture fostering.**
- **Unique method to evaluate questionnaire result.**

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《16》

Some Learning Points from the assessments done for 3.5 years

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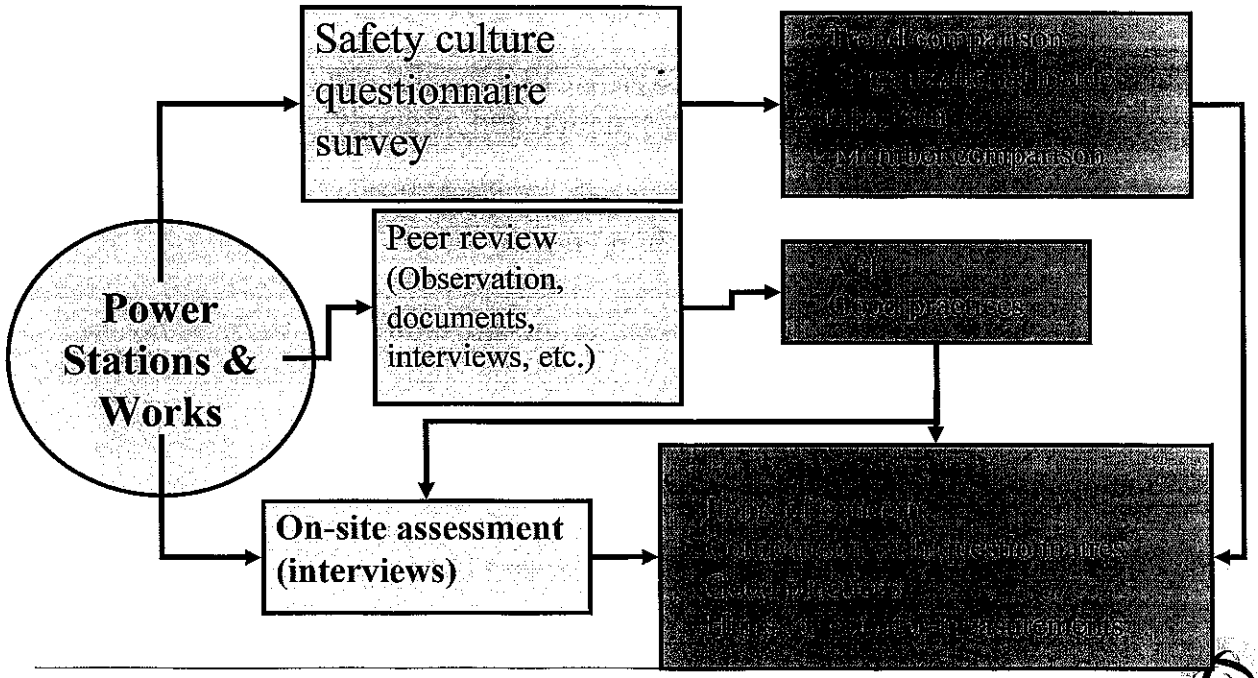
《17》

Relationship between On-site interviews and other Methods



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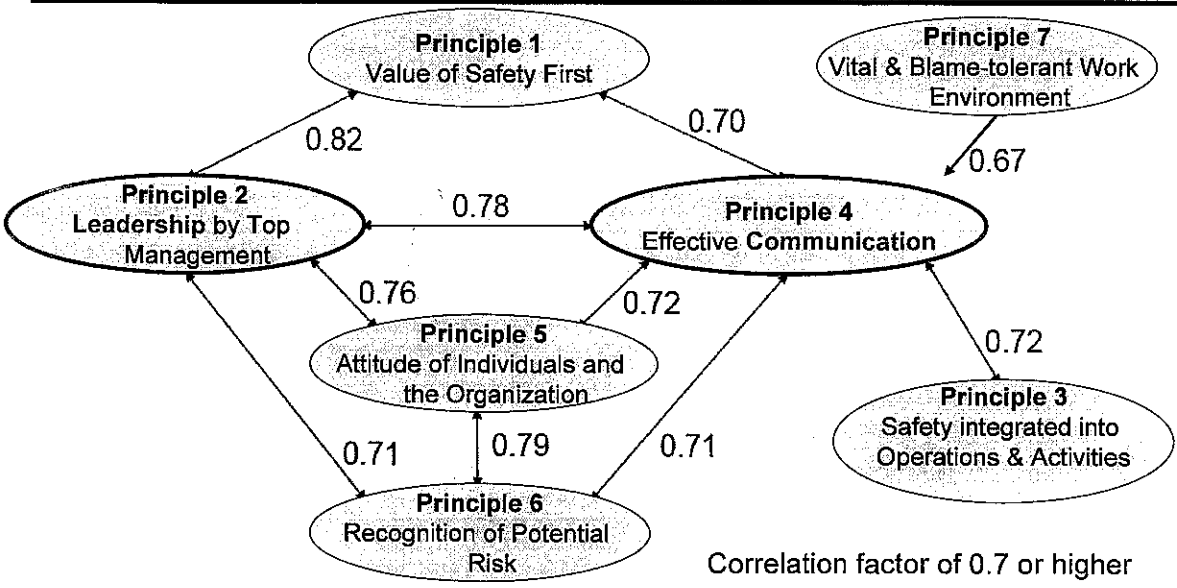
《18》

Correlation among JANTI's 7 Principles (example)

- Taken from results of the Third Safety Culture Questionnaire (data from approx. 14,000 people)
- **Positive correlation for all seven principles**
- Leadership and communication show significant linkage with the other principles



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《19》

Examples of Good Results found in on-site Diagnosis (1/3)

Leadership and Commitment

- When on-site operators ask safety issues to the section chief, he/she quickly and accurately assess the situation and offer advice.
- The section chief and division chief are able to clearly and easily convey their expectations to those under him/her.
- The supervisor takes a digital camera to the site almost daily. Also, he/she uses a risk table to give instructions and comments to those under him/her.
- By having top manager visit on-site, their value; safety first as the whole company is firmly conveyed to those under him/her.
- The supervisor maintains an attitude to go out to the operating site no matter how busy he/she may be.

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《20》

Examples of Good Results found in on-site Diagnosis (2/3)

Safety Assurance Behavior

- When faced with an unexpected or unfamiliar situation, workers stop and report it to their supervisor, consult about what should be done and get reports from those under them as well. After stopping operations , the reasons for stopping are explained to those working at the site, as much as possible.

- On-site workers are encouraged to be proactive about reporting unsafe areas , operational near miss ,problems by section chief and division chief. In result ,many needs, concerns that they have are absorbed.

- By providing partner companies with written details of these unsafe areas and operational problems, or by having the construction supervisors discuss them, information on site safety is absorbed.

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《21》

Examples of Good Results found in on-site Diagnosis (3/3)

Corrective Action and Resolution

- In investigations into the causes of problems, assigning blame and issuing penalties is not the focus. Ascertaining the cause of the problem so as to prevent a recurrence is what's important.

- Teachable problem examples are incorporated into manuals. This helps ensure that the problems illustrated in the manual do not happen again.

- Simulation training using simulators incorporating similar elements to past accidents and problems are used to give workers experience with handling such situations.

- Even for small problems, those who were involved discuss all the facts. Information exchange meetings are established to help reduce resistance to sharing information about problems.

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《22》

Organizational Characteristics with Good Practice

Common characteristics found in organizations which produce good results in our assessments are,

- Clear safety policy and strong attitude to improve by top management
- Strong resolve to instill safety deeply into on-site operations
- Activities to close the distance between management and on-site operations (including partner companies)
- Strong manager leadership and understanding and consensus (followership) of site operators

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《23》

Notes on Safety Culture self-assessment Methods

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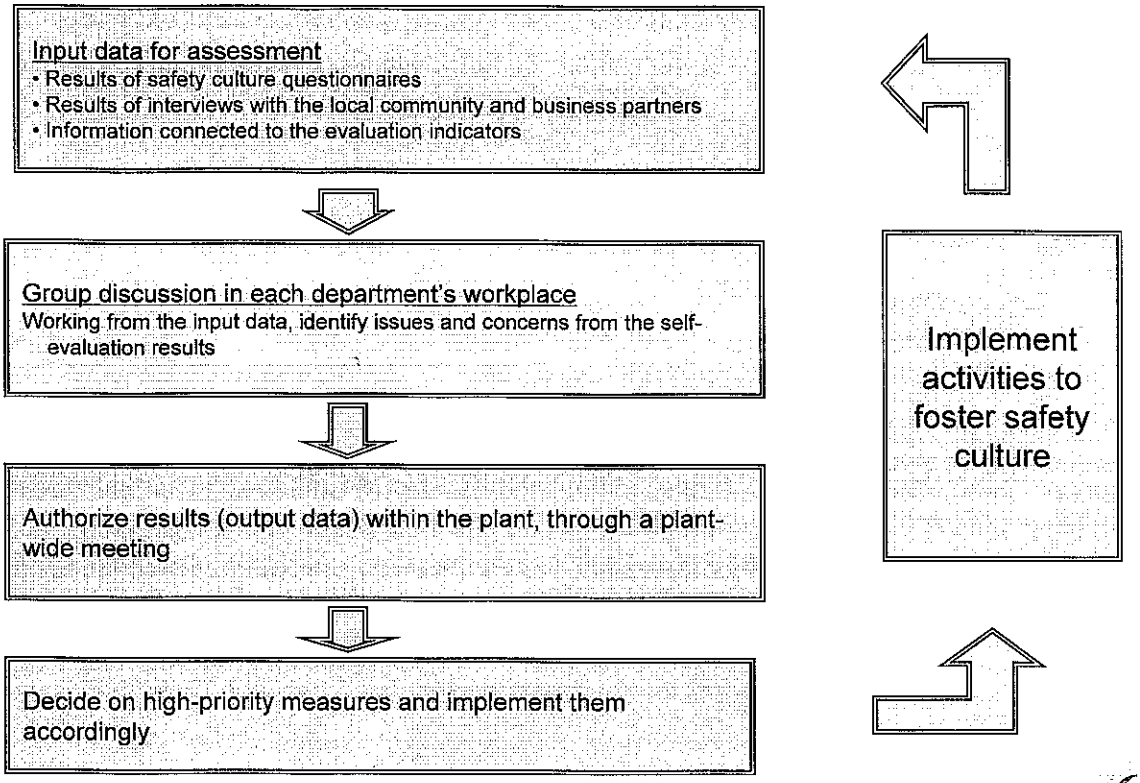
《24》

Example of a Safety Culture Self-Assessment



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《25》

Method Selection

Method	Advantages	Disadvantages
Questionnaire	Questionnaires allow the effective collection of large amounts of data. Since the evaluation results can be summarized quantitatively, it is possible to gauge changes in trends and compare results relative to other plants.	It is difficult to surmise the causes behind the results because only general summaries of the questions are made. Minority opinions are not taken into consideration.
Individual interviews	The interviewer can tailoring questions to suit the interviewee's position, job, location, etc., and the interviewer can probe the factors behind answers. Easy to obtain candid opinions.	Data may be biased by the interviewer's or interviewee's disposition. Takes time and money to obtain data.
Safety performance indicators (PIs) and related materials	Trends can be ascertained with PIs because quantitative evaluations can be obtained.	PIs themselves become the objective. May deviate from the intent of the evaluation.
Group discussions	Group discussions allow for the exchange of safety culture issues and make it easier to reach consensus or decisions on those issues.	Opinions can be swayed by leaders, and evaluation results tend to lose objectivity and become subjective. Group members may overlook latent issues.
...	...	...

It is recommended that evaluation should be rely on multiple methods!

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《26》

Some Questions to Ask When Studying (Selecting) Safety Culture assessment Methods

- In view of the evaluation's purpose, will the method collect valid data that will lead to improvements?
- Can the weaknesses of each evaluation method be overcome by combining several methods?
- Is the evaluation realistic and grounded on the plant's characteristics (SWOT)?
- Is the objective straying from finding improvements to simply conducting the evaluation?

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《27》

Specific Signs of Deteriorating Safety Culture (1/2)

- Gaps between resource plans that prioritize safety and their effectiveness, and a lack of revisions to resource plans (or else such an attitude is prevalent)
- Order of priorities for responding to safety, necessities, and urgencies is unclear, or else the order of priorities is not followed
- Decisions are made based on cost factors
- Lack of agreement on a decision-making process for work plans and scheduling changes that will put a priority on safety
- Almost no inter-departmental cooperation or shared decision making, and departments act autonomously without input from outsiders
- Decisions are not made in a timely fashion

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《28》

Specific Signs of Deteriorating Safety Culture (2/2)

- Prevalence of a mood causing employees to hesitate to report bad news, their own mistakes, or near misses, or else the lack of an atmosphere that encourages employees to freely volunteer information
- Errors and near misses are not analyzed or assessed, or else they are not fed back to the organization
- After an incident, the plant is reactivated without performing a full analysis or setting out contingency measures
- Complacent about current performance and a lack of questioning problem discoveries

These are, in a way, the antithesis of safety culture principles

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《29》

Indicators for Activity Effectiveness Evaluations

With PIs, there is a substantial risk that the objective becomes just reaching the PIs themselves. Setting PIs requires exceptional prudence since they are intended to ascertain the current situation and become the trigger for activities for future endeavors.

Different Types of Indicators

"Output indicators" **called** *lagging indicators* **show the safety performance in terms of measures of past performance eg., injury rates.**

"Input indicators" **called** *leading indicators* **monitor the processes that are effecting and maintaining safety performance. These are usually the implementation of management processes and programmes which are designed to improve and maintain safety performance.**

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《30》

Examples of Indicators for Activity Effectiveness Evaluations (1/4)

Principle I: Organization and Resource Management

Leading indicators (PD)	*Lagging indicators (CA)*
• Existence of mechanisms to incorporate into personnel evaluations the degree of participation in and contribution to safety activities; and the extent that the mechanisms are implemented • Number of people in management with significant time and experience primarily in safety operations	• Degree that actual conditions are reflected in organizational philosophies, policies, and decision-making processes (are opinions and wishes of employees conveyed to management?) • Extent that organizational philosophies and polices raise the safety awareness and safe practices of employees

Principle II: Leadership and Commitment

Leading indicators (PD)	*Lagging indicators (CA)*
• Extent that mechanisms to groom safety specialists as leaders and that training with this curriculum are implemented	• Number of nonconformities and the delays to plans caused by incorrect decisions

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《31》

Examples of Indicators for Activity Effectiveness Evaluations (2/4)

Principle III: Work Management, etc.

Leading indicators (PD)	*Lagging indicators (CA)*
• Degree of training systemization and certification • Extent of specialist training and consultation for cross-department safety management • Number of training sessions on, for example, what to look for during site patrols	• Extent of workplace environment improvements (reduction of work-related injury risks) and the amount of improvement in employee satisfaction and motivation due to site patrols and other improvement activities

Principle IV: Communications

Leading indicators (PD)	*Lagging indicators (CA)*
• Extent of campaigns to activate communications throughout the company and management-led campaigns that have incorporated communication results in concrete measures	• Number of human errors and facility non-conformities caused by a lack of communications

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《32》

Examples of Indicators for Activity Effectiveness Evaluations (3/4)

Principle V: Questioning and Learning Attitude

Leading indicators (PD)	*Lagging indicators (CA)*
• Extent that external best practices and preeminent examples on safety are utilized and incorporated in own safety management operations	• Number of occurrences of similar non-conformities that have not yet been incorporated into training or exercises • Facilities or mechanisms that have not been updated due to stagnant improvement activities

Principle VI: Awareness of Latent Risks

Leading indicators (PD)	*Lagging indicators (CA)*
• Extent that a database has been constructed to unify risk information from various sources and that measures are implemented using the database prior to work operations	• Number of similar reoccurring non-conformities for which the current measures have not been sufficiently verified

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《33》

Examples of Indicators for Activity Effectiveness Evaluations (4/4)

Principle VII: Organization Climate Conducive to Speaking Freely

Leading indicators (PD)	*Lagging indicators (CA)*
• Mechanisms and the extent of their implementation for handling employee requests • Number of direct dialog sessions with top executives about safety	• Awareness of the degree employees contribute to their work and find challenge in their work • Extent of excess pressure and exhaustion caused by process delays, etc. • Prevalence of a mood that condemns mistakes

Extent that employee awareness surveys, by means of third-party onsite surveys, questionnaires, and interviews, are used to ascertain organizational trends, and the extent that the survey results are incorporated into business plans and drafts of improvement measures

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《34》

Improvements to JANTI's Safety Culture Assessment Methods

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《35》

Issues Found through Safety Culture Assessments Onsite Diagnoses (2009)

Total of 19 issues

- 9 issues connected with implementation methods
- 4 issues connected with interview content
- 4 issues connected with analyses and evaluations
- 2 issues connected with the usage of evaluations

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《36》

(1) Enhancements to Preliminary Surveys

Issue	Information, starting with information about the plant's activities to foster safety culture, on overtime hours, age distribution, and the plant's status, including incident information, should be gathered and ranked beforehand, and then this information should be used when specifying interview points and in analysis and evaluations.
Response guideline	• Without burdening the operator, obtain and organize wherever possible information about the plant's activities to foster safety culture and information on overtime hours and the age distribution in the department to be interviewed. Observe work processes as necessary. • Hold an interview policy meeting before the onsite diagnosis and share the obtained information and safety culture questionnaire results with all team members and identify questions and points that should be extracted and probed in the interviews.

Trial onsite diagnoses conducted in FY 2009

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《37》

(2) Systemization of Interview Points

Issue	Are interview points duly systemized along the seven safety culture principles?
Response guideline	Arrange 22 elements and their attributes connected to the seven safety culture principles. Work on systemizing interview points based on the arranged attributes. Devise interview questions so the interviewee has a clear picture of what the questions are asking.

Systemization work is complete and will be applied in FY 2010

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《38》

(3) Verification of Minority Opinions

Issue	Are important issues for the plant included in minority negative opinions?
Response guideline	At the evaluation meeting looking at the onsite diagnosis results, study* minority negative opinions selected as needing verification and, based on requests by the operator, examine follow-up questionnaires to verify whether these are substantial issues.

***Study minority opinions**
Comprehensive examination of responses that suggest something substantial from their tone, such as brazen answers or heated answers, responses that suggest an awareness of a problem, responses that may contain latent majority opinions, responses from people who are thought to be particularly perceptive about the plant's situation, and responses considered important in terms of safety culture.

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《39》

Comparison of IAEA's SCART and to JANTI's Methods

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《40》

Comparison of SCART and JANTI's Safety Culture Assessments (1/2)

	SCART	JANTI Safety Culture Assessment
Implementing entity	IAEA (regulatory side)	JANTI (operator side)
Requesting entity	Operators or countries (regulators)	Operators
Assessment team	Six to eight reviewers (all from a different country)	Three expert interviewers Six secretaries
Duration	Two weeks (on site)	Three to four days
Targets	Entire organization (generation, maintenance, assistance organizations) Three classes (from managers to line supervisors) About 90 people in total	Generation and maintenance Three classes (at or below assistant manager level) About 30 to 42 people in total
Assessment tools	IAEA Safety Culture 5 characteristics 37 attributes	JANTI Safety Culture 7 principles (22 attributes)

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《41》

Comparison of SCART and JANTI's Safety Culture Assessments (2/2)

	SCART	JANTI Safety Culture Assessment
Other characteristics	• One characteristic per day • Confirm validity of results in a final interview with upper management • Resident regulatory official also interviewed	• Ask all questions to all employees
Results	Report drafted on site – Attribute assessments – "Good Practices" – "Recommendations" – "Suggestions"	Data taken to JANTI where it is analyzed; report made about four months later – Report provides positive points, negative points, and suggestions to improve negative points for each of the seven safety culture principles
Follow ups	Follow-up mission 12 to 18 months later	Follow ups conducted periodically at the request of the host

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Fail-Safe and Feel-Unsafe

Fail-Safe

Mechanisms ensure the operating safety of equipment or devices, even when there is a partial failure or incorrect operation.

Feel-Unsafe

Equipment or device operators feel unsafe.

Sensitivity to ask "will we run the risk?" is important, whenever something seems unusual.

Never judge based on excessive consideration and mistake.

Source: Pr.Michio Yoshida, lecture at the 70th JANTI Safety-Promotion Visit

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Safety Culture Series Vol. 8

Thinking Through Case Examples

How Can We Foster a Safety Culture?

Japan Nuclear Technology Institute

(p. 1)

Preface

The Japan Nuclear Technology Institute (JANTI) aims to promote and further enhance the safety of nuclear power, focusing on five core areas – "Collection, analysis, and use of information", "Supporting the promotion of safety culture", "Promoting the development of consensus standards", "Development of technical expertise" and "Training nuclear engineers and preserving their skills."

In the area of promoting safety culture, JANTI conducts a wide variety of activities including peer reviews, in which members visit member offices and evaluate nuclear power safety from a specialist standpoint, safety culture assessments, hosting seminars and running Safety Caravan visitations, and providing study materials via e-learning and the Safety Culture Series of booklets.

This, the eighth volume in the Safety Culture Series, is entitled "Thinking Through Case Examples: How Can We Foster a Safety Culture?" It adopts a new approach by selecting material directly related to the fostering of safety culture from information on specific case examples obtained during Safety Caravan visitations, seminars, and safety culture assessments, and providing analysis of the case examples.

It is our hope that this booklet will aid in group discussions, workplace conferences, and training of new employees, deepen your understanding of activities aimed at fostering nuclear power safety culture, and assist you in your own safety initiatives and endeavors.

February 2011

Takao Fujie
President and CEO, Japan Nuclear Technology Institute

(p. 2)

CONTENTS

Structure of this booklet and directions for use

In this booklet, JANTI's seven principles of safety culture are re-ordered in line with the concept that safety culture is to be fostered in stages, and enumerated along with keywords, case examples, commentary, and "Think about it!" discussion points.

- Keywords: Specific factors that are essential to each Principle.
- Case examples: Information on case examples gleaned from JANTI activities such as peer reviews and Safety Caravans.
- Commentary: Summaries of lecture notes from Safety Caravans.
- Think about it!: Discussion points intended to raise each person's awareness of issues through group discussions and workplace conferences on the themes contained herein.

Approach to Fostering a Safety Culture

While human behavior is to a large extent determined by social and organizational rules, or by norms and common-sense principles that have not been codified as rules per se, it is unrealistic to believe that the entirety of human behavior can be regulated by a manual.

For people involved in nuclear power to make appropriate decisions in all manner of situations, it is first of all essential for entire organizations to share the common value of safety as the overriding priority, so that taking actions to ensure safety becomes second nature for everyone concerned, and this norm is stably maintained over the long term. For this to occur, the attitude that "safety is an overriding priority" must be instilled and entrenched as a shared value within the organization. Also, the extent to which "safety is an overriding priority" has been instilled in the organization must be checked on a regular basis by incorporating third-party perspectives, and every step taken to ensure safety values are universally shared, including making improvements when necessary, as safety awareness is said to go into decline from the moment safety culture is thought to have been "achieved." This lays the fundamental groundwork for fostering of safety culture.

So what are the specific approaches used to make "safety is an overriding priority" a fundamental and shared value within an organization, and keep it that way? First of all, the organization must make an appeal to each of its members and work on a long-term basis to raise awareness of safety issues. This entails implementing a wide range of safety activities (activities aimed at fostering safety culture), but in this effort factors such as worker motivation, a workplace environment in which people feel free to speak out, leadership of top management, and effective communication within the organization, between different generations, and with business partners and the community, play a vital role in propelling the activities forward.

The next approach is risk management that can recognize and counteract a decline in safety culture before it occurs. Risk management means "feeling unsafe" at all times, and working to uncover potential risks and take adequate preventive measures. It also means integrating effective security mechanisms into everyday work duties, as well as revising operating procedures and manuals, and establishing and maintaining measures to enforce strict compliance with rules. In addition, it is necessary to uphold an attitude of inquiry and learning at all times, and to make positive use of negative information such as case examples of close calls and near misses.

Finally, we must not forget that fostering safety culture means making steady, continuous efforts now and on into the future, which means taking steps such as on-the-job training of younger workers in order to hand down to posterity the skills and techniques essential to safety promotion activities.

The above is a summary of JANTI's outlook on fostering safety culture, based on the insights gleaned from our activities thus far. The keywords in blue on this page will be discussed individually in this booklet, with case examples and commentary given for each. We hope that this booklet will further deepen your understanding of safety culture, and assist you in your own safety initiatives and group discussions of safety issues.

(p. 4)

Chapter 1
Shared Values Placing Safety as the Top Priority

Keywords
- Instilling and entrenching "safety is an Overriding Priority" as a shared value within the organization
- Checking the extent to which "safety is an overriding priority" has been instilled in the organization on a regular basis by incorporating third-party perspectives

"Safety is an overriding priority" as a fundamental value means always putting safety first, while continuing to uphold the fundamental business mission of administering nuclear power-related enterprises in a smooth and trouble-free fashion, boosting plant performance and providing products on schedule with consistent quality. This is of the utmost importance, particularly now when series of accidents, incidents and problems have eroded public trust in the safety of nuclear power.

First and foremost, fostering a safety culture requires everyone concerned with an organization to share the same fundamental values regarding safety. This means not only ensuring these shared values pervade the entire organization, but also ensuring that each and every individual has a clear recognition of the paramount importance of safety.

(p. 5)

Instilling and entrenching "safety is an overriding priority" as a shared value within the organization

Case Example (1)
The code of behavior at Nuclear Power Plant A calls for "visiting the plant site," "holding discussions," and "making improvements," and all management-level personnel make frequent visits to the plant. Managers take the initiative in holding discussions with staff on-site, identifying safety issues, and promoting activities to improve safety, all of which has the effect of deepening mutual trust between management and on-site workers. As a result, on-site workers give management high praise, saying "their enthusiasm for safety is palpable."

Case Example (2)
When Employee B was operating Equipment C as usual, an alarm sounded, and an abnormality in one of the internal components was identified. In such a situation, standard operating procedure would be to halt operation, report to a supervisor, and file a request for repairs with the maintenance division. However, Employee B decided that it would be unacceptable to stop the equipment and let the product being worked on go to waste, so he replaced the component by himself, and as a result Equipment C had to be shut down for an extended period. If the employee had put safety first and followed the correct procedure, the equipment could have been repaired in a short period of time, but his erroneous judgment ended up exacerbating the trouble and failing to fulfill the fundamental business mission of the facility.

Commentary
"Safety is an overriding priority" is the most important fundamental value on which safety culture is fostered, and must underpin all activities. As described in Case Example (1), management must take the initiative in instilling and entrenching this value within the organization, and must give in-depth explanations, show consideration, make improvements to processes and address resource issues such as staff shortages, so as to uphold this value and gain the understanding and confidence of all workers concerned.
To instill and entrench "safety is an overriding priority" as a shared value within the organization, it is vital to foster a climate and establish a system in which everyone concerned can unite and work together as a team.

Source / Reference: Lecture notes from the 98th Safety Caravan Visitation

Think about it!
Does your workplace operate according to the policy that "safety is an overriding priority"?
If not, why not?

Do you have all the resources (personnel, budget, capacity to handle processes) necessary for safe operation?
If not, why? How can this issue be resolved?

(p. 6)

Checking the extent to which "safety is an overriding priority" has been instilled in the organization on a regular basis by incorporating third-party perspectives

Case Example (1)
At Business Location A, an organizational assessment was carried out by a third-party institution, and when management read the report of this assessment they realized it was radically different from the information they had obtained thus far through channels inside the organization. It was clear that these channels did not necessarily adequately reflect the true opinions of staff on-site. With this in mind, the management of Business Location A decided to have organizational assessments carried out by a third-party institution on a regular basis, obtain unvarnished commentary on issues at the work site, and make improvements accordingly.

Case Example (2)
At Business Location B, when checking the current situation, management endeavors to incorporate viewpoints of people with other fields of specialization completely unrelated to the industry in order to gain a more valid picture of the situation. For example, female workers or people from other fields are sent along on safety patrols, and they have provided any number of unique comments on things the people in the division itself would never have noticed.

Commentary
Checking the situation within an organization on a regular basis, gauging it accurately and making improvements are indispensable for fostering safety culture. For this it is necessary to create a climate in which the opinions of on-site workers and middle management are consistently reaching the ears of top executives. However, people within an organization have a tendency to hold back or filter their true thoughts in consideration of one another's feelings or for fear of retribution.
As illustrated in the two case examples above, to gain an accurate picture of the situation it is necessary not only to implement self-checks, but also to incorporate third-party perspectives, and to let the observational powers of outsiders play a positive role in shaping one's own organization.

Source / Reference: Lecture notes from the 105th and 119th Safety Caravan Visitations

[☒]
1. Incorporation of third-party perspectives
MP
2. Self-contained group
MP
3. Self-contained group
MP
4. Self-contained group

5.
The MP (Migratory Person) system
In this system, people within a company regularly make the rounds of other divisions ("migrating"), checking each division's situation from an outsider's viewpoint.

Think about it!
Are the genuine, unadulterated opinions of workers on-site reaching top management's ears? When checking the situation, do you incorporate third-party perspectives and feed them into the

PDCA cycle?
(p. 7)

Chapter 2
Stimulating Workplace Environment

Keywords
- Keeping worker motivation high
- Creating a workplace environment in which people feel free to speak out

Now that we've discussed the importance of Shared Values Placing Safety as the Top Priority, let's consider "a truly vibrant and creative workplace environment in which people feel free to speak out" and "making sure each member of an organization has a job worth doing."

(p. 8)

Keeping worker motivation high

Case Example (1)
When young Employee A was inspecting a piece of equipment, Sectional manager B directly oversaw his work and praised him, saying "It's just like Supervisor C told me, your work is careful and thorough. Good job!" Employee A was happy not only because he was praised by the sectional manager, but also because he realized that his supervisor was monitoring his work and recognizing his efforts day to day. This is an example of how Sectional manager B consistently observes his subordinate A's work performance, notes the areas in which he excels, and finds good opportunities to compliment him on them.

Case Example (2)
Mr. D is not satisfied with his job. He feels that "I have heavy responsibilities, but my day-to-day work is monotonous, and my evaluations from my superiors get no better no matter how well I do. What a dull job!" Looking at people in other divisions, his impression is that "those people have jobs where it's easy to produce good results and get positive evaluations. I'm jealous."

Commentary
Worker motivation is an indispensable element of safety culture.
To boost the motivation of subordinates, it's important not to take it for granted that they do their jobs well – instead, superiors must take an interest in their subordinates and approach them directly on the job to express gratitude and give encouragement, thereby broadcasting the message that superiors are paying attention and watching over them. Also, it's important to remember that factors such as clarifying the goals and significance of each job, effectively delegating duties and authority, spicing things up with variety, and allocating adequate time for tasks have a strong influence on subordinates' motivation. Meanwhile, on an individual level the goal is for each worker to be satisfied with his or her job, feel it is worth doing and have a sense of professional pride. If workers are dissatisfied, they will be less motivated, and this could even have an adverse impact on safety. Don't be content with the status quo, but continually strive to make improvements, and to recognize the significance of each task and action, so as to acknowledge jobs well done and achieve an appropriate level of self-esteem.

Source / Reference: Lecture notes from the 113th Safety Caravan Visitation and 18th Managers' Seminar

Think about it!
Do you praise your subordinates effectively? (Do your superiors praise you enough?)
Do you or your team have an appropriate level of self-esteem and professional pride?
Do you endeavor to boost the motivation of your subordinates or colleagues?
If things are not going well, why do think this might be?

(p. 9)

Creating a workplace environment in which people feel free to speak out

Case Example (1)
Mr. B, a young employee in the Power Generation Division, noticed something in his workplace and reported it to Sectional manager A, only to be told, "Yes, OF COURSE that's how it's done!" After that, Mr. B was afraid to speak up, and hesitated to report anything to Sectional manager A. Noticing what was happening, Sectional manager A regretted his snapping at Mr. B and other employees, and has since become much more receptive to what his subordinates have to say – to the extent that they even consult him on private matters.

Case Example (2)
At Business Location C, there are monthly study sessions where employees study material related to their own job duties. Older, highly experienced employees adopt the role of lecturer at these sessions, and they intentionally give mistaken explanations which the listeners identify and correct. Having such sessions on a regular basis not only creates a climate in which members feel comfortable pointing out one another's mistakes, but also helps the session participants to remember the material they studied clearly.

Commentary
A workplace where people cannot express themselves freely is a highly hazardous one.
As described in Case Example (1), superiors' behavior can make subordinates afraid to state their opinions. On the other hand, as described in Case Example (2), unique training activities can create an atmosphere in which people feel comfortable pointing out one another's mistakes on a day-to-day basis.
Fostering safety culture means working to realize an open workplace environment in which people can take the initiative in saying what's on their minds without fretting about what the boss will think or having to rely on others. This can be accomplished through managers optimizing the authority gradient within their teams and maintaining a workplace climate in which people are alert but not stressed out, as well as listening open-mindedly to subordinates' or colleagues' opinions and observations and honing their ability to make appropriate judgments.

Source / Reference: Lecture notes from the 113th Safety Caravan Visitation and 18th Managers' Seminar

Think about it!
Are you able to say what's on your mind in a timely fashion?
If not, why not?

Do you listen carefully to other people's opinions and observations?
If not, why not?

(p. 10)

Chapter 3
Leadership

Keywords

- Workplace safety activities directly led by management
- Clear statements from top executives to the effect that "safety is the overriding priority"

To ensure everyone in an organization recognizes safety as the overriding priority, leadership by top executives and managers is required in addition to factors such as motivation and a stimulating workplace environment.

(p. 11)

Workplace safety activities directly led by management

Case Example (1)
In the operating division of Power Plant A, the manager calls together the members of his operating team for frequent meetings and actively encourages them to follow the "Ho-Ren-So" (reporting, communication, and consultation) policy so as to nip erroneous decisions and irregularities in the bud. Also, in post-work meetings, all the members including the manager himself are asked their opinions on pertinent topics, and asked to reflect on whether particular judgments or actions were appropriate. As a result, all the members are in the habit of thinking seriously about whether each course of action is really the best possible one.

Case Example (2)
In Section C of Business Location B, there was no clear division of duties that are shared among multiple divisions, and as a result there was a situation where equipment failure looked imminent. After Employee D reported this to a superior, the superior called together all members of relevant divisions to clarify division of duties and delegation of authority. Afterwards, Employee D was not only able to have peace of mind on the job, he also gained confidence thanks to being delegated authority.

Commentary
Managers who bridge the gap between workers on site and top executives play a central role in ensuring workplace safety. As they act not only as vertical channels of communication within the organization, but also as horizontal channels with connections to partner corporations and so forth, it is vital for these managers to show leadership in safety activities.
As shown in the two case examples, when managers show direct leadership with a stance and actions that place top priority on safety, workplace safety activities become more meaningful. Managers' strong will and firm leadership, including clarifying division of duties, is vital for fostering safety culture.
Refer to the "PM theory" outlined in the column on page 13 for more specifics on what is expected of managers.

Source / Reference: Lecture notes from the 18th Managers' Seminar

Think about it!
Are workplace safety activities in your organization directly led by management?
Are managers' strong will and leadership apparent?

(p. 12)

Clear statements from top executives to the effect that "safety is the overriding priority"

Case Example (1)
The head of Power Plant A exhibits strong leadership, visiting the work floor every day to interact with plant employees and staff from partner corporations, displaying his own commitment to safety, keeping track of problems and setting forth clear policy directions. He also responds positively to requests made by employees at meetings, and views boosting employee motivation as one of his most important tasks.

Case Example (2)
At Power Plant B, the company's attitude toward safety has recently shifted. Employee C has noticed this change, noting that "recently sufficient budget and personnel are being assigned to safety activities. We can feel comfortable submitting proposals for improvements, and responses come quickly. This is a great place to work!" This employee gets a strong sense that the company is firmly committed to safety.

Commentary
The clear and powerful leadership of top executives is a critical factor in fostering a safety culture. As described in Case Example (1), making proactive and easily understandable statements on safety policy is a must. Top executives also need to interact with staff, lead efforts to cultivate an organizational climate in which people can speak their minds, and encourage employees to think and act on their own initiative.
Also, as described in Case Example (2), it is vital for top executives to ensure support for each individual is provided on an organizational level, by giving the "safety first" policy concrete backup such as resources and personnel.

Source / Reference: Lecture notes from the 14th Managers' Seminar and 115th Safety Caravan Visitation

Think about it!
Is top management's unwavering dedication to safety clearly apparent?
Do you feel there is a divergence between the company' policy on safety and actual workplace practices?
If so, what makes you feel this way?

(p. 13)

PM Theory

What kind of people make effective leaders who maximize their subordinates' talent and dedication? Here we will attempt to answer this question based on the "PM theory" advocated by Professor Juji Misumi, a well-known scholar of leadership.

The PM theory posits two types of behavior, "P-oriented" and "M-oriented," that are required of leaders. "P" is for "performance," in other words behavior aimed at meeting business targets, and "M" is for "maintenance," or behavior aimed at unifying a group of people or maintaining relations with other people. Here are some specific examples:

[Examples of P-oriented behavior]
Giving instructions calmly when trouble breaks out.
Having sufficient specialized knowledge.
Pointing out subordinates' failings on the job.

[Examples of M-oriented behavior]
Praising subordinates for their efforts.
Staying attentive to subordinates' feelings and keeping them focused.
Making small talk with subordinates during breaks and being attentive to their personal issues as well.

The graph at right shows the P-oriented and M-oriented behavior of bus company executives, expressed numerically and plotted. First of all, look at the arrow on the graph. The further it extends to the upper right, the more optimal leadership was being exhibited in terms of both "P" and "M" behavior (PM). Meanwhile, the further it extends to the lower left, the more inadequate both "P" and "M" behavior were, indicating that the subject is not exhibiting leadership as desired or not meeting the expectations of subordinates (pm).

[図]
1. M Degree to which group-maintenance behavior is exhibited
2. P Degree to which target-meeting behavior is exhibited
3. Accidents occur
pm
4. No accidents
PM

When this arrow is cross-referenced against the frequency with which accidents occurred on the watch of each bus company executive, it is evident that accidents did not occur under the jurisdiction of those executives that exhibited superlative leadership. At the same time, on the lower left where the executive's leadership, in other words the influence of the supervisor on his subordinates, becomes weaker, a large number of accidents occurred. These findings reveal that improved leadership has a vital role to play in reducing the number of accidents.

We can think of superlative leadership as understanding the characteristics of "P-oriented" and "M-oriented" behavior and knowing the appropriate approach to take depending on the situation.

Source / Reference: Lecture notes from the 100th and 105th Safety Caravan Visitations

(p. 14)

Chapter 4
Fluid Communications

Keywords
- Enhancing communication within the organization

Barriers within organizations exist
- Making active efforts to interact with one another regardless of age group
- Enhancing communication with partner corporations

Building communications infrastructure
- Taking the initiative in interacting with the local community

Communication is an indispensible element of leadership, of shared values placing safety as the top priority, and of shared awareness of risks.. Organizations must always maintain fluid and open communications within the organization, with partner corporations and other external organizations, and with the general public.

(p. 15)

Enhancing communication within the organization

Barriers within organizations exist

Case Example (1)

CAP (Corrective Action Program) meetings are held at Business Location A every morning, and all employees may attend, ensuring that all information that ought to be shared including information on irregularities and process modifications reaches everyone without exception. Thanks to these meetings, Employee B can easily stay abreast of what's happening in other divisions, and has also made it a habit to present negative information on his own initiative.

Case Example (2)

At Power Plant C, there is insufficient communication between the power generation and maintenance divisions, and this has already led to equipment failures in the past. In response to this situation, and under instructions from his section manager, Employee D always makes sure to have a face-to-face discussion with relevant personnel before performing tasks that straddle multiple divisions.

Commentary

Communication is a vital factor, indispensable to fostering a safety culture. As illustrated by the two Case Examples above, there is a need to enhance communication through a wide range of initiatives.

Anyone can relate to the difficulty of communicating effectively within an organization. Don't forget that even members of the same organization, if they have different backgrounds including age, rank, division, or area of specialization, may talk at cross purposes due to discrepancies in their values and way of thinking. What is common sense to you, may not be common sense to everybody. Be sure to recognize this, and talk together to avoid misunderstanding of the contents of instructions or the intent of remarks, so as to maximize the quality and precision of communication.

Source / Reference: Lecture notes from the 100th and 105th Safety Caravan Visitations

Think about it!

Do you enjoy full and effective communication with other divisions?
If not, why not?

Do you adequately recognize the fact that "what is common sense to you, may not be common sense to everybody"?

(p. 16)

Making active efforts to interact with one another regardless of age group

Case Example (1)
Staff at Power Plant A have put together a file containing a wide range of useful know-how. However, younger employees make little effort to use and learn from this file. Meanwhile, veteran employees adopt an attitude of "Just watch me and learn how it's done, kid!" As a result, younger workers are hesitant to ask the long-time employees questions, and fail to glean valuable information from them. There is an overall failure to communicate.

Case Example (2)
At Business Location B, Mr. C was a newly hired employee who tended to shut himself off from superiors and co-workers. Mr. D, a more experienced worker, was troubled by Mr. C's isolation. One day, Mr. D decided to try out the hobby he had heard Mr. C was fond of, and later brought up the topic, telling Mr. C how much he had enjoyed it. This created an opportunity for the two of them to talk about a topic of common interest, and they gradually came to converse more and more.

Commentary
Handing down skills and techniques to posterity is vital for the maintenance and advancement of an organization's technological strength. If there is insufficient communication among employees of different generations, as described in Case Example (1), skills and techniques may not be handed down. To achieve full-fledged communication regardless of age, both younger and older employees must acknowledge the differences in their values, and make every effort to find common ground.
One effective way to do this is for people of different age groups to interact away from the workplace and start getting to know one another better, as described in Case Example (2). A sense of unity pervading the organization can be encouraged through hobby clubs and circles or volunteer activities.
As for on-the-job communication, veteran employees must be absolutely sure to avoid the mentality of "younger employees are novices, I've got to teach them what's what." Younger and older employees must approach tasks side by side as partners. For this it is necessary for the more experienced employees to see things through newer employees' eyes, then gradually raise the level of discourse, gradually and patiently educating them without looking down on them. Meanwhile, younger employees must not forget to speak politely and act properly, making it fulfilling and rewarding for veteran employees to train them.

Source / Reference: Lecture notes from the 103rd Safety Caravan Visitation and 18th Managers' Seminar

Think about it!
Are there opportunities for younger and older members of your organization to interact?
Do members of your organization mutually acknowledge the differences in their values and mentality?

(p. 17)

Enhancing communication with partner corporations
Building communications infrastructure

Case Example (1)
At Power Plant A, staff of partner corporations are brought along on patrols and take part in other activities so that they feel the plant is their plant as well, and the sense of ownership and responsibility takes root and flourishes. This helps to achieve a positive work environment and encourages employees to take pride in their work.

Case Example (2)
Mr. C, an employee at Power Plant B, pays frequent visits to the offices of a partner corporation and gets various reports. From time to time, he listens to staff complaints and concerns in the smoking room and gets valuable information straight from the source. One day, when he had to visit the partner corporation to make a request that was difficult to ask for, they happily acceded to the request and even told him he hadn't needed to bother coming all the way to ask for it in person.

Commentary
On many work floors, much of the actual work is performed by employees of partner corporations, and communicating with them is essential to ensuring safety. However, the multi-layered structure of organizations often leads to inadequate exchange of information. Even if there is a system for one-way conveyance of information in place, in many cases people do not share a correct understanding of the situation on both ends, and this is one factor contributing to accidents and problems.
The two case examples described situations in which staff of partner corporations are seen as "equal partners" sharing in the work without undue concern for contractual particulars, with communication actively emphasized to as to build a full-fledged communication infrastructure in which messages are sure to get across when needed. It is vital that such networks of communication include everyone involved, and that all work together as partners sharing the common goal of safety.

Source / Reference: Lecture notes from the 103rd Safety Caravan Visitation and 18th Managers' Seminar

Think about it!
Do you make active efforts to interact with people from partner corporations and cultivate a positive relationship?
Do you think of relationships with partner corporations and other relevant institutions as an "equal partnership"?

(p. 18)

Taking the initiative in interacting with the local community

Case Example (1)

Employee B from Business Location A attended a workshop on ethics for engineers which illustrated its points with a case example of an accident involving a particular product, with workshop participants analyzing and discussing the causes of the accident. Through this experience, Employee B came to think about things from the perspective of the product's manufacturers, users, local governments and other concerned parties, and learned about safety-related problem solving and risk management. Looking back on the workshop, Employee B says "We had very meaningful discussions. I learned not to take a one-sided view or force one set of values on anyone, but rather to look at things from a variety of viewpoints including those of people in the local community. It was a great experience."

Case Example (2)

Representatives of Power Plant C pay visits to every household in the vicinity and interact directly with local people, aiming to put a human face on the plant and gain the acceptance of people living nearby. One day when out paying visits, Employee D was pleasantly surprised to receive heartwarming words of encouragement from people in the community. Since then, Employee D tries to visualize what would make people in the surrounding community the happiest when carrying out his duties on the job.

Commentary

Building a positive relationship with society is an important challenge for the nuclear power industry. At the core of this lies the problem of "nuclear engineers lacking sufficient understanding of the anxieties and concerns of ordinary citizens." First of all, it is vital to recognize these anxieties and concerns, and to bridge the gap between the industry and society by reforming the mentality of people in the industry through training as described in Case Example (1).

Currently, a large number of nuclear power plants are endeavoring to interact with local communities as described in Case Example (2). However, these efforts will not achieve the goal of closing the gap between plant and community if employees have the attitude that they "are being forced to take time out from their busy schedules for this activity." To eliminate this mentality of "being forced to" do it, it is necessary to boost motivation to participate through direct involvement by top executives and other organizational-level efforts.

Source / Reference: Lecture notes from the 104th Safety Caravan Visitation and 18th Managers' Seminar

Think about it!

Do you have sufficient understanding of the anxieties and concerns of people in the local community?

Do you enthusiastically take part in efforts to interact with the local community?

(p. 19)

Chapter 5

Recognition of Potential Risks

Keywords

- Uncovering potential risks and addressing them effectively
- Sharpening perceptiveness and "feeling unsafe" at all times

When you think "uh-oh!", it should be a red light

Consideration of potential risks is a critical element of safety. Now that we've discussed leadership and communication, let's move on to "recognition of potential risks," which plays a major role in ensuring safety.

(p. 20)

Uncovering potential risks and addressing them effectively

Case Example (1)
At Power Plant A, TBM (Tool Box Meetings) are held prior to starting work, and employees work with members of partner corporations to weed out hazards. Potential risks are also enumerated on a "risk management sheet" and shared with partner corporations at preliminary study panels. At these times, every attempt is made to ensure memorable communication is made and all related personnel fully grasp the important points. Strategies include actively seeking and listening carefully to participants' opinions, verbally confirming what the speaker is seeking to communicate, adopting effective ideas and putting them to work right away, and incorporating jokes to make the participants laugh.

Case Example (2)
At Power Plant B, everyone brings a digital camera on to the work floor so they can photograph any potentially hazardous situations they see and post the pictures on the wall. Once photos are posted, other staff view them and sign them if they agree the situation poses a potential risk. Once five people have signed, the situation is dealt with on a priority basis. This initiative allows everyone to recognize hazards and pinpoint potential risks, and to share individuals' realizations and perceptions throughout the entire organization.

Commentary
Risk assessment plays a crucial role in the pre-emption of accidents and problems. Potential risks must be clearly identified, analyzed and assessed before actual work begins, and measures taken in accordance with the importance of the risk. It is also essential to prevent accidents and problems by learning humbly from case examples from other companies and other industries. We must never forget that these case examples are not "somebody else's problem," but mistakes that we ourselves must learn from.

Source / Reference: Lecture notes from the 18th Managers' Seminar and 113th Safety Caravan Visitation

Think about it!
Do risk assessments play a useful role in streamlining and rationalization efforts?
Are all relevant personnel made aware of identified risks and other important information at pre-work TBM?
Do risk assessments lead to adoption of substantial measures and verification of their effectiveness? If not, why not?

(p. 21)

Sharpening perceptiveness and "feeling unsafe" at all times

When you think "uh-oh!", it should be a red light

Case Example (1)

At meetings held every morning at Power Plant A, staff make one-minute speeches on safety. These cover topics ranging from on-the-job occurrences to close calls and near misses their private lives, and as each employee has to make a speech once a month or so, they are continually searching for material for their next speech. This naturally helps to sharpen their awareness. In addition, talking about their experiences in front of others helps to ensure the staff share common awareness of and perspectives on hazards.

Case Example (2)

Activities for younger employees at Business Location B include joining in patrols with senior officials and training aimed at boosting perceptiveness. These are aimed at cultivating sharp awareness of abnormalities and keen perceptiveness. They also share things they have noticed about close calls and near misses that could lead to accidents, and undergo visualization training so as to pick up on potential accidents in the making.

Commentary

Nipping accidents and problems in the bud requires sharpening perceptiveness so as to recognize abnormalities right away, and avoiding being lulled into a false sense of security. In other words one should to some extent "feel unsafe" at all times. In the two examples, employees sharpen their perceptiveness by intentionally maintaining this sense of feeling unsafe.

Employee education, on-the-job training and hands-on experience are necessary for sharpening perceptiveness. The more knowledge and experience employees have amassed, the more abnormalities they will be able to identify.

Source / Reference: Lecture notes from the 92nd and 105th Safety Caravan Visitations and 18th Managers' Seminar

Think about it!

On the job, do you "feel unsafe" to an appropriate extent day to day?

Do employees share things they have noticed about safety with others in the workplace, or otherwise take steps to create an environment where abnormalities will quickly be noticed?

(p. 22)

Chapter 6

Safety Assurance Frameworks

Keywords

- Rethinking manuals and how they are used
- Building frameworks for compliance with rules
- Effective upkeep of rules

To foster a safety culture, it is vital to understand the policy that "safety is the overriding priority," to construct safety assurance frameworks based on this understanding, and to put them into practice on the job.

It is also important to consider that interpersonal communication and risk recognition are inextricably intertwined with the manuals and rules on which safety assurance frameworks are based.

(p. 23)

Rethinking manuals and how they are used

Case Example (1)

A manual at Business Location A contains blank spaces for writing in key points, techniques, hunches and so on based on experience and knowledge gained on the job, which can be used as a tool for workers to answer questions at pre-work TBM, etc. Other manuals, as well, contain photographs and illustrations for easy visualization, which are effective because they harness the sense of sight to aid understanding and allow workers to compare the manual's contents with actual equipment on site.

Case Example (2)

At one of B Co.'s construction sites, "work behavior observation" was carried out to determine whether work was proceeding according to the manual. This observation was used to aid the process of making a user-friendly manual that elicits a positive response from workers by pinpointing factors that interfere with work efficiency and safety, and to come up with proposed improvements. During the observation, problem behavior was pointed out on the spot, while good practices were publicized within the company.

Commentary

In recent years, manuals and checklists have become bloated and complicated, causing problems in the workplace. Workers are not confident in their ability to understand the entire manual, and confusion may ensue.

In Case Example (1), attempts are being made to create a highly effective manual that can be used at TBM, etc. by writing useful information in. Case Example (2) describes efforts to make a user-friendly manual based on close assessment of the work site situation.

Manuals should be made with the workers who use them on site in mind.

Source / Reference: Lecture notes from the 119th Safety Caravan Visitation

Think about it!

Are manuals being revised and updated appropriately?

Is every attempt being made to make and use manuals based on the workers' perspective?

(p. 24)

Building frameworks for compliance with rules

Case Example (1)

At Business Location A, staff observe one another's behavior, and people who violate rules are given yellow cards like in a soccer game. This system encourages compliance with rules. On the other hand, people who make a positive contribution to safety are given "green cards," and when they accumulate a certain amount, they have their photo posted on the plant wall as a "Safe Person."

Case Example (2)

At a chemical plant run by B Co., a system known as the "tag rule" has been introduced. This entails employees pointing out violations of rules to one another. The person whose violation was pointed out is "it," and remains "it" until they find another violator and "tag" them by notifying them of their violation.

In addition, all members have "thank you cards," which they give to the people who point out their violations. Every six months the number of cards collected by each person is tabulated, and the person who has collected the most cards receives an award.

Commentary

Ensuring thorough compliance with rules means relying not only on reminders, training, and individual motivation and awareness, but also introducing frameworks within which rules will naturally be followed. The two case examples given above involve mutual monitoring of compliance in a "game" format, leading to a workplace environment in which rules are naturally followed.

It is also important to examine the rules themselves. Rules that are too difficult to follow lead to the creation of "alternate rules" and rule violations. A good rule must be realistic, logical and easy to understand, so that its fairness is acknowledged by the people who are being asked to follow it. Their approval should be sought before the adoption of the rule is finalized.

Source / Reference: Lecture notes from the 109th and 119th Safety Caravan Visitations

Think about it!

Do you implement any unique activities aimed at ensuring compliance with rules?
Are there rules in your organization that are difficult for anyone to follow?

(25)
Effective upkeep of rules

Case Example (1)
When Mr. A, a younger employee, looked at the work manual, he found an item that he couldn't understand the basis of. When he asked Mr. B, a more experienced employee, about it, he learned that it referred to training related to a past accident, and finally he understood it. This indicates that when putting together such manuals, it is important to explain things in a manner understandable to younger staff who may not know the background behind it.

Case Example (2)
At Chemical Company C, there were numerous comments from employees to the effect that "there are too many rules for us to follow them all." As a result, the rules themselves were changed. For example, the rule that "all employees must carry pH test strips with them when making rounds on the work floor" was abolished, and instead test strips were placed at various sites. As for the rule that "during construction work, it is absolutely forbidden to enter roped-off areas," it was impossible to get around the site if the rule was followed, and so it was not actually followed. For this reason the rule was changed to from "no entering roped-off areas" to "be absolutely sure to ascertain safety before passing through." Company C managed to reduce the number of rules in this way, by gaining a firm grasp of the real situation on the work floor.

Commentary
Just as equipment needs to be inspected regularly, rules require upkeep as well.
In addition to ensuring everyone knows and follows the rules, it is important to conduct "know-why" training to ensure everyone knows WHY it is important to follow the rules. If people understand why rules exist, they will want to follow them of their own accord, and will be more likely to notice small irregularities and be able to deal effectively with situations that may arise.
Upkeep of rules also requires checking whether individual employees follow the rules, and making assessments. People will be more motivated to follow rules if they are praised when praise is due and penalized when penalty is due. Regular "scrapping and building" should be implemented, and inappropriate rules should be updated or abolished as needed.

Source / Reference: Lecture notes from the 109th and 119th Safety Caravan Visitations

Think about it!
For each individual rule, do you have a correct understanding of why it is necessary?
Are rules being subjected to "scrap and build" when appropriate?

(p. 26)
Column 2

Understanding human nature

Why do people sometimes ignore manuals and violate rules? Let us examine these safety-threatening behaviors from the point of view of human nature.

When rules are violated, it may be for one of the following reasons:

(1) The person is not aware of the rule.
(2) The person does not correctly understand the rule.
(3) The person disagrees with the rule.
(4) Nobody else follows the rule either.
(5) Breaking the rule does not result in a warning or penalty.
(6) The benefits of breaking the rule outweigh the disadvantages.

Reasons (1) and (2) can be addressed through training that ensures everyone knows and understands the rule. But how about reasons (3) through (6)? It is necessary to take measures that take human nature into account when dealing with these cases, where someone understands the rule but intentionally violates it.

Social conformity
The figure below illustrates the findings of a questionnaire on rule violations given to the general public.
[図] [時計回り]
1. A
I follow rules because those around me do
(Social conformist type)

2. B
I follow rules when it suits my purposes
(Self-centered type)

3. C
I seek to understand rules and follow them my own way
(Merit-minded type)

4. D
I follow rules to the letter
(Rules-for-rules'-sake type)

5. Follows rules roughly and flexibly

6. Places importance on actions of those around

7. Places importance on own needs

8. Follows rules closely and precisely

This survey posits two axes, the "degree of flexibility in following rules" and the "degree of influence from others," from which the following four patterns are extrapolated.

(p. 27)
A: Follows the rules because those around are doing so (Social conformist type)
B: Regardless of whether or not those around are complying, always places own needs before the rules (Self-centered type)
C: Pays attention to whether those around are complying, but follows rules based on own understanding and approval of them (Merit-seeking type)
D: Regardless of whether or not those around are complying, always follows rules scrupulously (Rules-for-rules'-sake type)

The responses to the questionnaire show that the social conformist "Type A" accounts for over half of the total. This is a classic case of social conformity, one of the basic characteristics of human nature, at work. Human beings are generally social animals living in communities, and as such have a tendency to conform to others' behavior and opinions.
For a specific example, think of the illegally parked bicycles one often sees outside train stations. While recognizing that parking a bicycle there violates a rule, people tend to think "everyone else is doing it, so I will too." This is simply human nature. On the other hand, if there is not a single illegally parked bicycle, people will hesitate to park a bicycle illegally on their own. When those around are strictly complying with the rules, it creates an atmosphere in which each person complies with them as well, and discourages violations.

The path of least resistance
The principle of "the path of least resistance" is also highly relevant to rule violations. Humans instinctively seek to finish tasks quickly, take it easy, and avoid unpleasantness. For this reason, when trying to achieve a goal, we tend to select the closest, the fastest, and the least resistant tools and methods, in other words we seek to expend the minimum of energy and select the easiest option. This is "the path of least resistance."
Let's go back to the example of illegal bicycle parking. In general a proper designated bicycle parking area is available a short distance from the station. However, we will expend less energy if we park our bicycles near the ticket gate rather than in a bicycle parking area some distance away. For this reason, people continue illegally parking their bicycles despite knowing it is prohibited, because it's "easier." Rule violations occur because the advantage gained (minimal expenditure of effort) makes it worthwhile to violate the rule.

As this example illustrates, human beings are born with innate tendencies that make them liable to ignore manuals and violate rules. With this thought firmly in mind, it is crucial to foster understanding of the necessity of following rules and manuals through "know-why" training, etc. It is also necessary to cultivate an atmosphere in which following the rules becomes second nature, through initiatives that make effective use of humankind's social conformist tendencies, such as the "yellow card" system described above.

Source / Reference: Lecture notes from the 119th Safety Caravan Visitation

(p. 28)

Chapter 7

Attitude of Organization and Individuals

Keywords

- Establish and maintain a stance of inquiring and learning about safety
- Make effective use of information on close calls and near misses to push for improvements
- Ensure that the skills and techniques of long-timers are handed down to younger employees

When it comes to frameworks for safety assurance, it is not acceptable to rely on the status quo. People must always question safety issues, learn, and take responsibility for making corrections, not only as individuals, but also as an organization.

(p. 29)

Establish and maintain a stance of inquiring and learning about safety

Case Example (1)

Mr. A, a work group leader, feels that young employees nowadays lack a sense of inquisitiveness about work procedures. He thinks it's because "if an inspection went well last time, it will probably go well next time, and things have been getting busier lately, so if they just follow pre-determined procedures they can avoid being scolded by the boss. What's more, even if they make a suggestion about how things could be improved, they won't earn praise for it, and instead will have an increased workload as they'll be asked to come up with a solution to the problem."

Case Example (2)

Mr. B checks system diagrams himself before starting work on something, and makes sure he understands the basis of work procedures. Particularly when preparing for a task that he's tackling for the first time, after a long hiatus, or with a modified approach, he makes sure to look up case examples of past failures and specifications and to double-check the work procedures. In addition, he never neglects to ask the workers if everything is all right to ensure no team members are suffering from health problems and everyone understands the procedures.

Commentary

Learning attitudes (attitudes of questioning safety issues, learning, and taking responsibility for making corrections) are vital for the fostering of a safety culture. In Case Example (1), it appears that such attitudes are lacking among younger workers. Workers will not be able to deal with unexpected situations when they occur without understanding the necessity for each process, taking an interest in the reasons behind things, and comprehending procedures correctly. Even when they are accustomed to a work procedure, workers should adopt a pro-active attitude towards safety by learning about the procedure in depth and asking more experienced employees about points they have difficulty understanding.

Source / Reference: Lecture notes from the 18th Managers' Seminar

Think about it!

Do you continually ask questions and learn new things about work methods and mechanisms? If not, why not?

(p. 30)

Make effective use of information on close calls and near misses to push for improvements

Case Example (1)
A great many employees at Business Location A feel that "being responsible for a near miss or close call is embarrassing, and what's more we'll be penalized," so they want to avoid doing so at all costs. For this reason, a unique system involving "hypothetical close calls and near misses" has been introduced. Employees can stop worrying about being held responsible, as they can preface their reports with "This is just a hypothetical situation, but..." What's more, they report not to their direct superiors, but to a specially established Close Call and Near Miss Office, so people reporting information feel comfortable. Upon reporting information, they are told "Thank you. Please contact us again," making them glad they decided to report it. Employees feel comfortable coming forward thanks to this system which recognizes that it takes courage to report a mistake.

Case Example (2)
Chemical company B Co. has identified all kinds of potential risk factors including close calls and near misses on various work floors, and is working to reduce them. Since this program was launched eight years ago, 6,787 proposals have been made, and training sessions and improvements to work procedures and environments have already addressed 89% of these. The entire company is working together to achieve a workplace environment where work can be done with a maximum of ease and a minimum of human error.

Commentary
According to Heinrich's law, actual accidents and problems are the tip of the iceberg, and there are many, many more near-accidents and close calls. It is thus vital to make effective use of information on close calls and near misses to implement improvements and nip accidents and problems in the bud. The two case examples describe workplaces where information on close calls and near misses is being collected with the above principle in mind. Safety activities are always in danger of turning into mere facades or routines. The way to prevent this is for everyone involved to think of safety as their own responsibility, and to make effective use of information on close calls and near misses and run them through the PDCA cycle so that fresh activities are always underway.

Source / Reference: Lecture notes from the 101st, 106th and 119th Safety Caravan Visitations and 18th Managers' Seminar

Think about it!
Are effective mechanisms in place to facilitate reporting of information on close calls and near misses?
If not, why not?

Is information on close calls and near misses being put to good use?

(p. 31)

Ensure that the skills and techniques of long-timers are handed down to younger employees

Case Example (1)
At Business Location A, younger employees and long-timers form pairs and patrol the work floor. At these times, the older employees do their best to impress their juniors with their skills and techniques. They also tell stories about mistakes and point out where they happened to give a sense of the here and now, ensuring that their partners go away with a vivid impression.
At the same time, the younger employees carry digital cameras and use them to photograph points of interest, then prepare reports including these photos and what they learned from their elders. These reports are used as a means of exchanging information at study sessions for younger workers, and thus the insights of veteran employees are passed down to as many of the young generation as possible.

Case Example (2)
Business Location B has introduced a "Skills Program" and "Key Person Program" in which skilled and technically apt veteran employees certified by the company provide guidance to the younger workers, ensuring that their expertise is handed down. These programs make it clear who should be consulted in which situations, setting the minds of the staff at ease. They also give long-time employees a sense of pride in their expertise.

Commentary
In recent years, the issue of handing down retiring employees' skills to the younger generation has become a serious one in many industries. Henceforth, it will be necessary to identify clearly which skills and techniques are necessary, and to construct frameworks in which they are effectively handed down and accumulated. It is also necessary to conduct these efforts in such a way that veteran staff can take pride in their skills and feel rewarded by the experience of educating their juniors.
Case Example (1) describes a program in which skills and techniques are handed down effectively, and the knowledge gleaned from long-time employees is exchanged among younger ones and their insights reach as many people as possible. Meanwhile, in Case Example (2), systematic organization of important skills and techniques leads to their fluid transfer to the next generation.

Source / Reference: Lecture notes from the 18th Managers' Seminar

Think about it!
Are younger employees being sufficiently exposed to the wealth of insights from veteran employees?
If not, why not?

How could the situation be improved?

(p. 32)

For further study...

Lecture notes from the 92nd Safety Caravan Visitation (Mar. 2007)

"Fostering a safety culture through a 'learning' organization" — Professor Toshio Sugiman, Kyoto University

Lecture notes from the 98th Safety Caravan Visitation (Oct. 2007)

"Human Factors and Safety Culture" — Professor Shiichirou Inoue, Kanto Gakuin University

Lecture notes from the 100th Safety Caravan Visitation (Nov. 2007)

"Group Aspects of Developing a Safety Culture—from Knowledge to Awareness, and to Action"— Professor Michio Yoshida, Kumamoto University

Lecture notes from the 101st Safety Caravan Visitation (Dec. 2007)

"Considering human factors and safety" — Akira Ishibashi, Director of the Research and Development Section, Japan Institute of Human Factors

Lecture notes from the 103rd Safety Caravan Visitation (Feb. 2008)

"Safety Culture as Seen from the Worksite — via Experience in the Management of the Research Reactor Facility" — Yoshihiro Nakagome, Emeritus Professor, University of Kyoto

Lecture notes from the 104th Safety Caravan Visitation (Apr. 2008)

"Considering the Relationship between Nuclear Power and Society — Reviewing the Connections among the Individual, Business Enterprises, and Society" — Dr. Masaharu Kitamura, Associate Member, Tohoku University New Industry Creation Hatchery Center

Lecture notes from the 105th Safety Caravan Visitation (Jun. 2008)

"The Safety Management of an Organization and Human Understanding — Safety as Seen from the Perspective of Group Dynamics" — Professor Michio Yoshida, Kumamoto University

Lecture notes from the 106th Safety Caravan Visitation (Aug. 2008)

"Human Factor Endeavors made by the Maintenance Division, All Nippon Airways — Avoidance of Human Errors and Countermeasures and their Implementation" — Toshiaki Kobori, Deputy Director, Department of Quality Assurance Engineering & Maintenance and Senior Manager for Planning & Administration, All Nippon Airways

Lecture notes from the 109th Safety Caravan Visitation (Nov. 2008)

"What is Safety Culture?: Constructing a safety culture that heads off human error" — Yuki Shuto, Director and Deputy General Manager, Research Institute for Social Safety

Lecture notes from the 111th Safety Caravan Visitation (Feb. 2009)

"Positive Ethics for Engineers – Self-actualization, Safety, Security and Values" — Professor Jun Fudano, Director, Applied Ethics Center for Engineering and Science at Kanazawa

Institute of Technology

Lecture notes from the 112th Safety Caravan Visitation (Mar. 2009)

"Organizational Individuality and Safety Culture" — Masaharu Kitamura, Professor Emeritus, Tohoku University

(p. 33)

Lecture notes from the 113th Safety Caravan Visitation (Sep. 2009)

"Workplace Safety and Motivation: The social psychology behind the desire to work" — Professor Michio Yoshida, Kumamoto University

Lecture notes from the 115th Safety Caravan Visitation (Nov. 2009)

"Thinking About Human Factors From a Communications Standpoint" — Professor Ekou Yagi, Osaka University Center for the Study of Communication-Design

Lecture notes from the 119th Safety Caravan Visitation (Jul. 2010)

"Lessons from Other Industries on Preventing Human Error – From the Perspective of Human Factors" — Dr. Seiichi Yoshimura, Deputy Director, Human Factors Research Center, Socio-economic Research Center, Central Research Institute of Electric Power Industry

Lecture notes from the 14th Managers' Seminar (Dec. 2007)

"The Way Safety Culture Ought to Be, Based on the History of Japan's Nuclear Industry, and Hereafter" — Isao Kuroda, Japan Institute of Human Factors

Lecture notes from the 15th Managers' Seminar (Dec. 2007)

"A New Era in Training -- Experiencing CRM Training Which Has a Proven Track Record in the Aviation Industry" — Akira Ishibashi, Director, Research and Development Section, Japan Institute of Human Factors

Lecture notes from the 18th Managers' Seminar (Dec. 2008)

"Safety Culture: Its Perception and Practice – Strategies for Accident Prevention through Shared Individual, Team and Organizational Values" — Professor Kenichi Takano, Graduate School of System Design and Management, Keio University

"Safety Culture's Key People — Middle Managers" President Shojiro Matsuura, Nuclear Safety Research Association

*The affiliations and posts of the lecturers were current at the time of the respective lectures.

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SC Benchmarking with INPO

JANTI's Idea on Lessons Learned from the Fukushima Daiichi Accident

-From the View Point of Safety Culture-

14-16 , Nov., 2011

Jun Hamada
Safety Culture Division
JANTI

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《1》

Table of Contents

JANTI will re-consider the idea on lessons from the Fukushima Daiichi Accident presented here , and will fix JANTI's lessons based on facts or formal information found by the progressing investigation in the near future.

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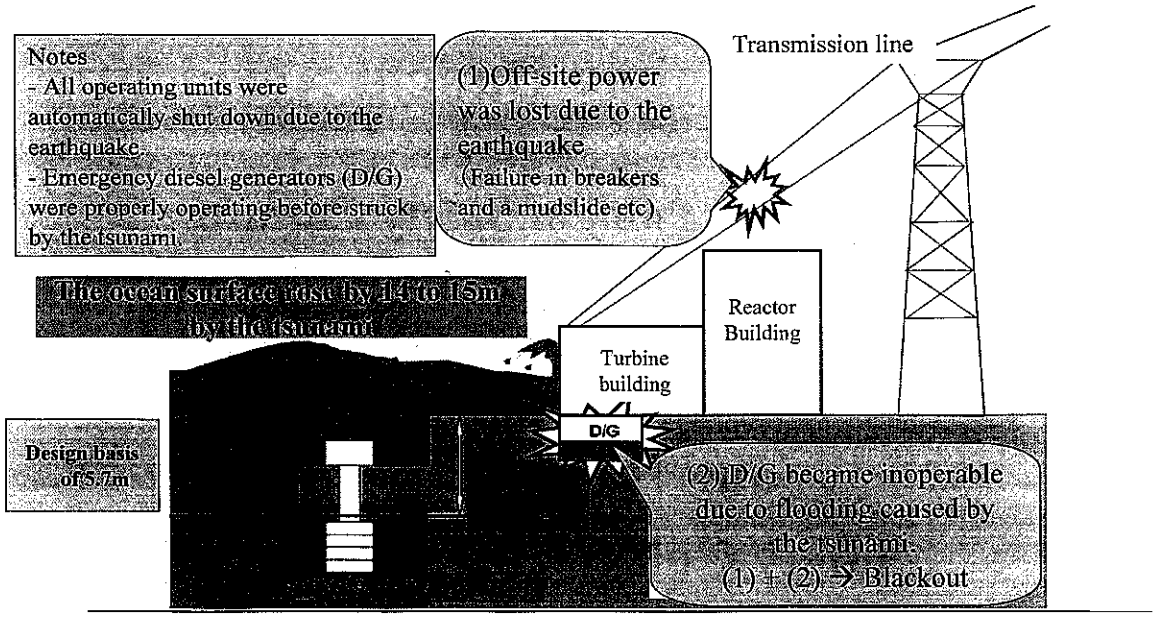
《2》

Fundamental Causes

Station blackout caused by a huge tsunami
and subsequent delay in power supply



NISA HP April 4: Prepared based on the material published for the IAEA side event

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《3》

Problems from the Viewpoint of Safety Culture

For an accident like Fukushima that exceeded DBA,
No serious discussions and preparations in the areas of design , operations, management (incl. AM), and emergency preparedness,

With the following in the background,
Lacked learning attitude
to study in real earnest on nuclear accidents that may involve serious consequences, but may occur with low probability, and to collect external information and new knowledge, considering that nuclear technology is special and unique in all decisions and actions.

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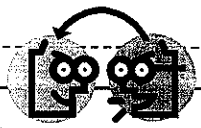
《4》

To Improve Learning Attitude

Lacked learning attitude
to study in real earnest on nuclear accidents that may involve serious consequences, but may occur with low probability, and to collect external information and new knowledge, considering that nuclear technology is special and unique in all decisions and actions.



Point 1: Change to Risk Taking

Point 2: Chang of Behavioral Patterns

Point 3: Re-recognition of Nuclear Safety

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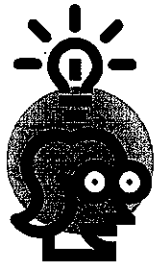
《5》

Point 1: Change to Risk Taking

-As shown in the flow on the next sheet, we should change our attitude by thinking "what if they occur" for events that may involve serious consequences, assessing their impact, and judging appropriate actions to take.

-When such actions are taken as a result, their back-fit to existing equipments should be considered appropriately.



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《6》

Change to Risks

For serious events with low probability, think "what if they occur" and perform "impact assessment" in case they occur.

As a result, in case the basic three functions might not be secured, decide "whether it is worth taking measures" and whether "such action is taken to prevent or mitigate consequences."

Take the measures, make preparations and perform training for emergency responses in case they occur.

Share information with relevant organizations

- Communicate information to and have consultations with other power stations
- Retrofit the existing equipment
- Feedback to new design

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《7》

Point 2: Chang of Behavioral Patterns

-Have the steady attitude to learn by asking other sites, plants, or domestic/overseas institutions, recognizing the differences in terms of safety design, gathering and analyzing relevant information, and so forth.

-To have this attitude, it is important
to refine sensitivity to something wrong or unusual,
to reflect on whether there was a tendency to exclude inconvenient facts and ignore minority/dissenting opinions, or whether we had too much confidence in ourselves, and
to express our opinions that we consider important in terms of safety in addition to create a workplace environment where everyone feels free to speak out and have discussions.

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《8》

Point 3: Re-recognition of Nuclear Safety

-Re-recognize that it is the primary responsibility of licensees to ensure nuclear safety,

-Aim to achieve higher safety levels, and

-Share the value of placing top priority on ensuring nuclear safety among the organization concerned.

To achieve these above, top manager's attitude and judgment are very important factors.

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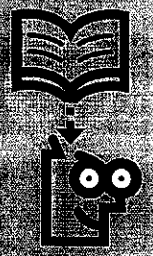
《9》

Idea on Lessons Learned

No1: Re-recognize the importance of nuclear safety



No2: Re-affirm the responsibility of licensees and the importance of top management

No3: Reinforce the questioning and learning attitude to ensure safety for events that will very rarely occur, but have a significant impact

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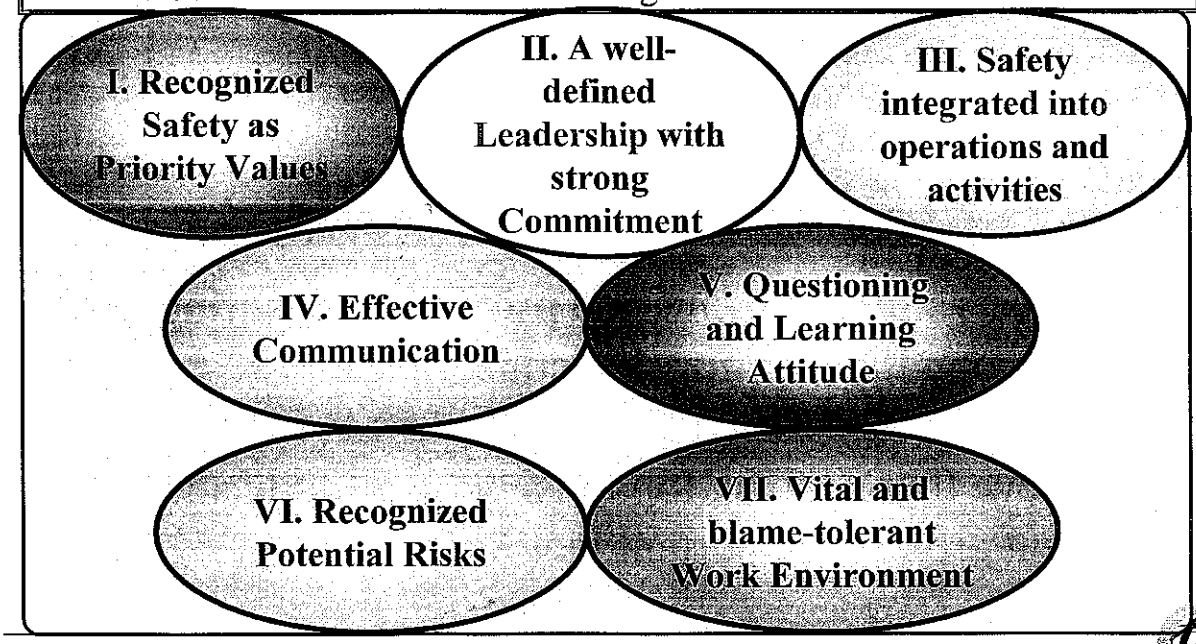
《10》

Current JANTI's 7 Principles

"The state in which all members of the organization share values that safety is an overriding priority,
these values are recognized throughout the organization, and
behaviors are based on this common recognition."



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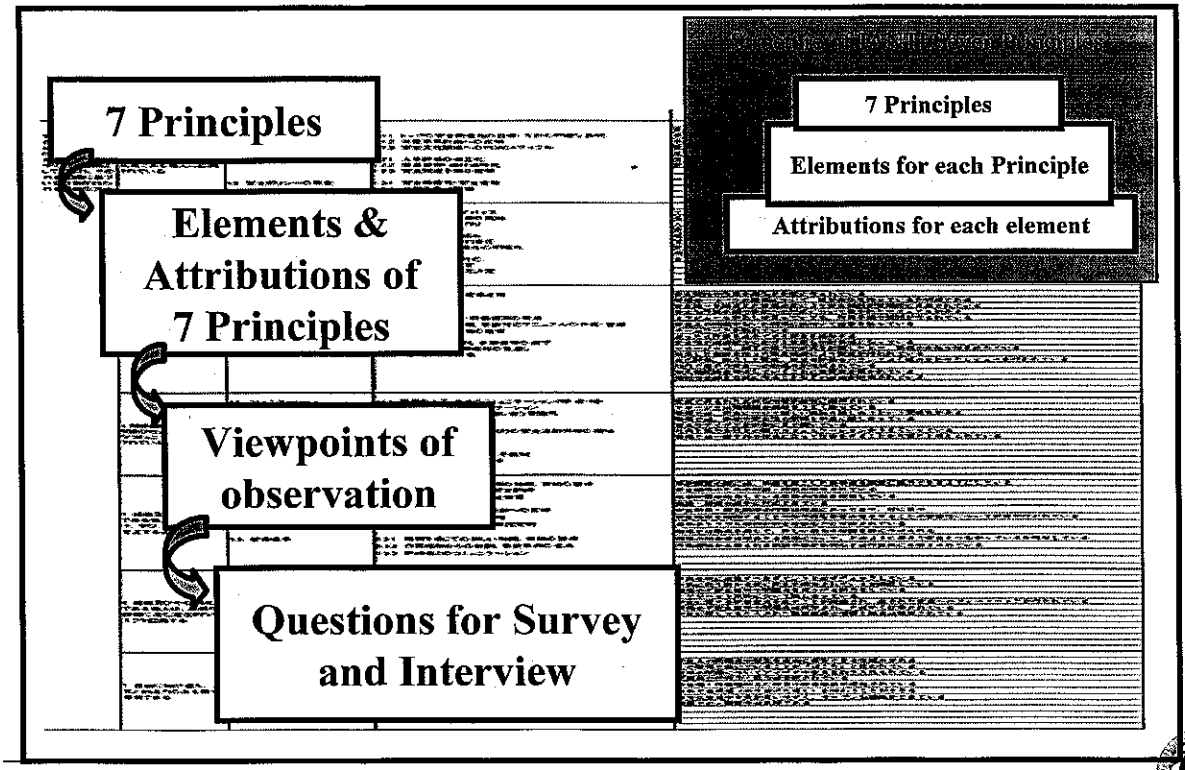
《11》

Current Structure of JANTI Principles



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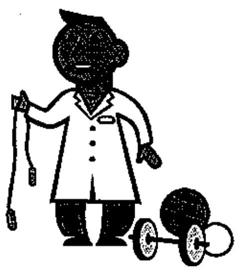
《12》 Reflecting the Idea on Lessons Learned

The conventional JANTI principles of safety culture will be re-examined.
(1) "Being aware of the particularity of nuclear technology at all times to be sensitive to nuclear safety" will be added as a new principle.
(2) For three principles, elements will be modified.
(3) For four principles, attributions will be modified.

- **Re-recognize nuclear safety** → **Being aware of the particularity of nuclear technology at all times to be sensitive to nuclear safety**
- **Re-affirm the responsibility of licensees and the attitude of top management** → **Recognized Safety as Priority Values**; **A well-defined Leadership with strong Commitment**
- **Reinforce the questioning and learning attitude to ensure safety for events that will very rarely occur, but have a significant impact** → **A well-defined Leadership with strong Commitment**; **Questioning and Learning Attitude**; **Recognized Potential Risks**

《13》 Policies Reflected in Activities (1/2)



《Reviewing Safety Culture Assessment》

- Field diagnosis will be improve
  to gather opinions from plant director-level personnel,
  to enlarge the scope of departments to interview, (所 … 通)
  to review interview items from the view points of nuclear safety, emergency preparedness, potential risks.
  → peer Review
- The entire assessment approach, including questionnaires, and the method of assisting in members' self-assessments will be improved as a long-range plan. ① improve assessment quality
  ②

《14》

Policies Reflected in Activities (2/2)

《Strengthen the Support
for Enhancing Nuclear Safety》

- Now we have experienced or learned about the accident, so it is a good opportunity to understand the importance of nuclear safety and to change behavioral patterns.

- JANTI's activities (caravans, seminars, training material provision, etc.) will be improved by incorporating the lessons learned to raise the members' awareness of nuclear safety.

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《15》

Now a good opportunity
to foster a Stronger Nuclear Safety Culture

Th k you

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