

***Report of Determining Official***  
***Scientific and Research Misconduct Allegation 2012-001***  
***December 20, 2012***

**Executive Summary**

This report summarizes the findings of the NOAA Integrity Review Panel Determining Official (DO) regarding allegations of Scientific and Research Misconduct by a NOAA employee. The allegations concern conduct that occurred in 2010 prior to the adoption of NOAA’s current Scientific Integrity Policy, NAO 202-735D (Policy). Consequently, the Integrity Review Panel (IRP or Panel), established by the Deputy Under Secretary for Operations (DUSO), applied the standard for evaluating misconduct that was in effect when the alleged scientific misconduct occurred. Under this standard, misconduct is defined as, “fabrication of results, plagiarism, or clear misstatement of facts.”<sup>1</sup>

Allegations of scientific and research misconduct were filed by Mr. Jeff Ruch on behalf of the Public Employees for Environmental Responsibility (PEER), herein referred to as the Complainant, against Dr. William Lehr, a Senior Scientist with the Emergency Response Division of the National Ocean Service’s Office of Response and Restoration (NOS/ORR), hereinafter referred to as the Respondent. (For administrative purposes, this allegation is identified as SRMA 2012-0001).

All of the allegations are associated with activities that followed the aftermath of the Deepwater Horizon oil spill in 2010. The Respondent led the Plume Calculation Team (Plume Team), one of four teams formed under the auspices of the Flow Rate Technical Group (FRTG). This group reported its findings to the National Incident Command.

On November 28, 2012, Dr. Paul Rago, chair of the IRP, provided to me, in my role as DO, the written report of the Panel. The report includes the written response of both the Complainant and Respondent to the report (a draft of which was provided for their review), as well as other pertinent documents and a detailed list of evidence relied upon by the Panel.<sup>2</sup> I have carefully considered all of this information, and it is my judgment that the Allegations made by the Complainant do not have sufficient substance to warrant further investigation. Consequently, the allegations are dismissed.

**1. INTRODUCTION**

The Integrity Review Panel (IRP or Panel) report addresses allegations of Scientific and Research Misconduct by a NOAA staff member who led the Plume Calculation Team (Plume Team) of the Flow Rate Technical Group (FRTG). The FRTG comprised four separate teams

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<sup>1</sup> This standard was informed by the White House Office of Science and Technology Policy guidance on the appropriate standard of conduct applicable to Federal scientists, 65 Fed. Reg. 76260 (December 6, 2000).

<sup>2</sup> These materials include, but are not limited to, material accompanying the original allegations by the Complainant, the written testimony of the parties, the Plume Team Final Report dated July 21, 2010 and the Powerpoint Presentation made on July 30, 2010 (“Final Presentation”).

using a variety of methods to develop estimates of the flow rate of the Deepwater Horizon oil spill in 2010. The alleged misconduct relates to the process of providing information about the estimates to senior decision makers.

The following is a summary of the allegations made by the Complainant (SMRA 2012-001 - PEER):

**Allegation 1. Falsification of Scientific Findings:** In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, and §7.02 [Respondent] intentionally falsified the Scientific Product of the Plume Team by naming his Final Report “*Deepwater Horizon Release Estimate of Rate by PIV*” and by reporting that the majority of the thirteen members of the Plume Team used a technology called Particle Image Velocimetry (PIV) and estimated an oil leak rate of 25,000 to 30,000 bpd. The truth is that only three of the thirteen members of the Plume Team used PIV for their official estimates of the oil leak rate.

**Allegation 2. Failure to Objectively Consider Conflicting Findings:** In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, and §7.02, [Respondent] intentionally omitted any discussion in his Final Report and Final Presentation about the use of a different technology called FTV by three other members of the Plume Team. The accurate estimates by FTV were in the range of 50,000 to 60,000 bpd, but [Respondent] did not report the estimates to key decision makers or to the public. [Respondent] failed to “objectively consider conflicting data” and failed to “accurately report results” to key decision makers.

**Allegation 3. Prevention of Conflicting Views from Being Reported to Key Decision Makers:** In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, §7.02 and NOAA’s Code of Ethics for Science Supervision and Management, [Respondent] prevented members of the Plume Team who used FTV from communicating their findings to key decision makers. On July 30, 2010, [Respondent] gave the Plume Team’s Final Presentation to the team of key decision makers (including DOE Sec. Chu, DOI Sec. Salazar, USGS Dir. McNutt, the Directors of three DOE National Labs, etc.) who were determining the government’s final estimate of the oil leak rate. Only the three members of the Plume Team who used PIV and underestimated the oil leak rate were informed of the Final Presentation and allowed to meet with the key decision makers. Members of the Plume Team using FTV were not informed of the Final Presentation. Thus, [Respondent] prevented the members using FTV from meeting with the key decision making team, and prevented “the timely communication of scientific findings” to key decision makers.

**Allegation 4. Fabrication of Findings and Failure to Provide Traceability of Data:** In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, §7.02, [Respondent] added an additional estimate by PIV from a scientist who was not a member of the Plume Team to his Final Report and Final Presentation. [Respondent] did not reveal to the Plume Team’s members, to peer reviewers, to key decision makers, or to the public that he added an estimate from a scientist who was not a member of the Plume Team. It appears that [Respondent] also altered the values of the estimates by PIV to make them appear identical and more “consistent.”

At the conclusion of its inquiry, the IRP did not reach a consensus on all of these allegations. In particular, the Panel did not reach agreement on Allegations 1, 2 and 4. Two panelists concluded that these allegations do not have sufficient substance to warrant investigation. The third panelist concluded that these allegations (at least in part) have sufficient substance to warrant

investigation. The Panel agreed Allegation 3 did not have sufficient substance to warrant investigation.

<b>Summary Recommendations on SRMA 2012-001</b>			
<b>Allegation</b>	<b>Rago</b>	<b>Hoke</b>	<b>Westley</b>
<b>Allegation 1. Falsification of Scientific Findings</b>	No investigation warranted.	No investigation warranted.	Investigation warranted (in part)
<b>Allegation 2. Failure to Objectively Consider Conflicting Findings:</b>	No investigation warranted.	No investigation warranted.	Investigation warranted (in part)
<b>Allegation 3. Prevention of Conflicting Views from Being Reported to Key Decision Makers:</b>	No investigation warranted.	No investigation warranted.	No investigation warranted.
<b>Allegation 4. Fabrication of Findings and Failure to Provide Traceability of Data</b>	No investigation warranted.	No investigation warranted.	Investigation warranted.
<b>Summary Recommendation</b>	Insufficient grounds to merit further investigation. Allegations should be dismissed.	Insufficient grounds to merit further investigation. Allegations should be dismissed.	Investigation warranted on part of Allegations 1 and 2, and Allegation 4.

## 2. DETERMINING OFFICIAL FINDINGS

Allegations against NOAA scientists regarding conduct that occurred prior to December 7, 2011, are evaluated under general principles of scientific misconduct long understood to apply to professional scientists. Specifically, misconduct is defined as “fabrication of results, plagiarism,

or clear misstatement of facts.”<sup>3</sup> Allegations are reviewed at several levels: an initial assessment is performed by the DUSO, who may refer the matter to an integrity review panel for inquiry and, if warranted, investigation. (All of these phases of the proceeding are outlined in detail in the Handbook, Section 5). As referenced above, the allegations in the current proceeding, SRMA 2012-001, were referred to the Integrity Review Panel earlier this year, and the Panel’s Inquiry Report was provided to me on November 28, 2012.

The role of the Inquiry Phase of a scientific and research misconduct proceeding is to assess whether the allegations have substance and to determine whether an investigation is warranted.<sup>4</sup>

- If the DO determines an investigation is warranted, a detailed Investigation Phase will be conducted, at the end of which the DO will determine whether misconduct has occurred and (if necessary) propose appropriate institutional administrative actions.
- If the DO determines that no investigation is warranted, the DO will explain the basis of his or her determination in writing.

The findings of the DO are final, and are to be reported to the DUSO and the Chair of the IRP.

In its Inquiry Report, the Panel explained the standard it used when evaluating the allegations: Specifically, whether the preponderance of evidence supports a finding that the allegations have sufficient substance to warrant further investigation. I have adopted this same standard in making my findings.

The Complainant has argued that the IRP went beyond its charge in the inquiry stage by conducting a fact-finding investigation. However, the Handbook specifically provides that during an inquiry “the review panel may collect any evidence it deems necessary to evaluate the merits of an allegation.”<sup>5</sup> I therefore find that the IRP acted properly and within its charge.

In evaluating the allegations listed below, I considered two unusual factors surrounding the activities of the Plume Team and writing of the Plume Team Final Report. First, the Plume Team met during an unprecedented national emergency and the Plume Team, along with the FRTG, was under intense pressure from the National Incident Command to produce estimates of the flow rate, often while members were still processing their data.

Second, the Plume Team Final Report (“Final Report”) was not a manuscript prepared for publication in a peer-reviewed journal with the corresponding standards of scholarship. Instead, as noted on p.1 of the Final Report, “all calculations and conclusions in this report are preliminary, and intended for the purpose, and only for the purpose, of aiding in assessing the extent of the spilled oil for ongoing response efforts”. This, of course, would not excuse fabrication of results, plagiarism, or clear misstatement of facts; however it does mean an incident report like this may not have the comprehensiveness and structure of a research

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<sup>3</sup> As described elsewhere in this report, NAO 202-735D (NOAA’s Scientific Integrity Policy) came into effect on December 7, 2011, well after the conduct underlying the allegations in this proceeding. While the substantive standards outlined in the Policy will not be applied retroactively, NOAA has decided to follow the procedures outlined in the Procedural Handbook (“Handbook”) that accompanied the Policy to guide the current proceeding.

<sup>4</sup> Handbook, Section 5.02.

<sup>5</sup> Handbook, Section 5.02(b).

monograph. For example, typically in most publications the appendices provide additional information on results presented in the main paper deemed too detailed for inclusion in the body of the paper. However, in this case the Respondent has explained that the material in the main report was not intended to be a summary of individual appendices, but rather to provide a high level, general explanation of the methodology of determining flow rates from visual tracking of fluid flow and present the flow estimates agreed to by the Plume Team (e.g., see p. 200 of the Final Report). The Respondent further notes that the consensus presented in the main body of the report was reached prior to the submission of the documenting material in the appendices. This approach, reflecting the urgent need to get a flow rate estimate to decision makers, resulted in a lack of clear connection between the results of the individual analyses described in the appendices and the summary statement in the main report.

I have reviewed the Complainant's allegations, the recommendations of the NOAA Integrity Review Panel (IRP), the response of the Complainant and Respondent to these recommendations, and other pertinent documents. The following sections describe my findings on the substance of these allegations and whether further investigation is warranted.

***Allegation 1. Falsification of Scientific Findings:*** *In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, and §7.02 [Respondent] intentionally falsified the Scientific Product of the Plume Team by naming his Final Report “Deepwater Horizon Release Estimate of Rate by PIV” and by reporting that the majority of the thirteen members of the Plume Team used a technology called Particle Image Velocimetry (PIV) and estimated an oil leak rate of 25,000 to 30,000 bpd. The truth is that only three of the thirteen members of the Plume Team used PIV for their official estimates of the oil leak rate.*

The first component of this allegation arises from differences in opinion on the use of the term PIV by the parties involved. The Plume Team Final Report includes a generic description of the PIV technique on pp. 8-10 of the main report that does not define PIV as a solely automated technique. The Respondent has indicated in his written testimony this is the sense in which he used the term in the title – i.e., to be inclusive of both automated and manual approaches. The Complainant clearly views PIV as a strictly automated method and uses the term “feature tracking velocimetry” or FTV for manual feature tracking methods. Only one Plume Team member actually used the term FTV in their written report even though two other team members employed manual feature tracking methods. This suggests FTV was not a widely used term at this time, even among the members of the Plume Team. There is no evidence that any members of the Plume Team objected to the title of the report before it was submitted on July 21, 2010. In their written reviews, none of the six external reviewers of the Plume Team Final Report questioned the use of PIV in the report title indicating that they did not see this as a misrepresentation of the content of the report. In fact, two reviewers of Appendix 7 (Reviewers 2 and 4) refer to the method reported in that appendix as “feature tracking (akin to PIV)” and “using the PIV method”.

I therefore do not believe the Respondent was trying to mislead the reader by using the term PIV in the report's title. At the time the Final Report was written, the term “PIV” was well known within the engineering community (over 200 published paper/abstracts on PIV between 2000-2010), while the term “feature tracking velocimetry or FTV” was new and had not been used in the peer reviewed literature. So in trying to distinguish the work done by the Plume Team from

other parallel efforts by other groups using very different approaches (e.g. acoustic plume imaging, direct *in situ* flow rate measurements, atmospheric sampling of plume volatiles), I believe the use of the term PIV in the title by the Respondent was appropriate, indicating to high-level decision makers a general approach of using video images of turbulent flow to deduce the overall rate of fluid flow (whether done manually or automatically).

**The available evidence does not support the allegation that the use of “PIV” in the Plume Team Report’s title was done to falsify the report or mislead the reader regarding its content. I thus agree with two of the three members of the IRP that this allegation lacks substance and no further investigation is warranted.**

The second component of this allegation is that the Respondent intentionally falsified the Plume Team Final Report by “reporting that the majority of the thirteen members of the Plume Team used a technology call Particle Imaging Velocimetry (PIV) and estimated an oil leak rate of 25,000 to 30,000 bbl/day” when only three of the Plume Team members used PIV for their official estimates of oil leak rate.

Like the IRP, I could not find anywhere in the Final Report where the statement is made that a “majority of thirteen members” of the Plume Team “used” PIV for their official estimates of the oil leak rate. There is a statement in the Executive Summary that “the main method employed to make estimates was a common fluid dynamic technique called particle image velocimetry (PIV)”. “Main” is not “majority”, nor does this statement explicitly or implicitly state how many team members used PIV. In fact, PIV was the “main” method used by the Plume Team if the more general definition of particle image velocimetry, including both automated and manual approaches, was adopted for the non-technical audience of this report.

**Since the Plume Team Final Report does not actually state that a “majority of the thirteen members of the Plume Team used PIV” to make flow rate estimates, I agree with all three members of the IRP that this allegation has no substance and does not warrant further investigation.**

*Allegation 2. Failure to Objectively Consider Conflicting Findings: In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, and §7.02, [Respondent] intentionally omitted any discussion in his Final Report and Final Presentation about the use of a different technology called FTV by three other members of the Plume Team. The accurate estimates by FTV were in the range of 50,000 to 60,000 bpd, but [Respondent] did not report the estimates to key decision makers or to the public. [Respondent] failed to “objectively consider conflicting data” and failed to “accurately report results” to key decision makers.*

The Plume Team Final Report contains a 12-page main report with flow rate estimates provided in the Executive Summary and Conclusions sections, and 200 pages of appendices. The appendices include a full description of the various techniques used by Plume Team members to estimate flow rate and the estimates they obtained. The main report and appendices were reviewed by six external experts and their unedited reviews and the responses by individual team members to these reviews are included in Appendix 10. Given that this report was not meant for a peer-reviewed journal, but only for the purpose of aiding the response team in assessing the

extent of the spilled oil and for ongoing response efforts, the report displays a high level of thoroughness and scientific transparency.

The Complainant repeatedly uses the term “Final Report” to refer only to the 12-page main report. However, the complete Final Report includes both the main report and the 200 pages of appendices. Therefore, in contrast to the allegations made by the Complainant, the Final Report does include a discussion of the limitations of the automated PIV method (Appendix 4), describes the manual FTV method (Appendix 7), and presents FTV results in Appendix 1 and 7. The entire report, including appendices, were provided to the FRTG and key decision makers so all of this information was available to them.

The 12-page main report, and the Final Presentation given on July 30, 2010, are consistent in not providing a detailed description of any of the individual techniques employed by team members, instead including those descriptions in the appendices of the Final Report. The main report presents only a very short general description of the flow tracking technique meant for a non-technical audience, as noted in response to Allegation 1 above. The Respondent believed that his audience (the National Incident Command and key decision makers) did not want to wade through a detailed description of half a dozen different techniques in the short summary report.

The short main report and the Final Presentation also do not include individual flow rate estimates from any of the individual studies described in the appendices, although they are summarized in the table in Appendix 1 of the Final Report. Instead, the Respondent has stated that the numbers included in the Executive Summary and Conclusions of the main report and in the Final Presentation (“35,000 to 45,0000 bbl/day, with the possibility the leak could be as high as 50,000 bbl/day”) were “consensus numbers agreed to by a majority of the team”. He testified he did not include the individual FTV results reported in Appendix 7 of the Final Report because the group as a whole never agreed to do so. He felt he should only include the team’s consensus estimate in the report summary.

One could argue about whether the Respondent should have included individual estimates in the main report (perhaps by reproducing a copy of the table in Appendix 1 in this part of the report). However, I don’t believe it was unreasonable for the author to focus in the Final Report’s Executive Summary and Conclusions, as well as in the Final Presentation, on the consensus results rather than on the details of results from each individual method which were well documented in the appendices. There appears to be no evidence that any members of the Plume Team objected to this approach prior to the submission of the Final Report on July 21<sup>st</sup>.

**The Final Report, including the main report and the appendices, delivered to the FRTG and key decision makers, includes a description of the different approaches used to make flow rate estimates, including FTV, describes the limitations of the automated PIV method in this application, and presents the flow rate estimates from these different methods. I therefore find, in agreement with two of the three IRP members, that this allegation lacks substance and no further investigation is warranted.**

**Allegation 3. Prevention of Conflicting Views from Being Reported to Key Decision Makers:** *In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, §7.02 and NOAA’s*

*Code of Ethics for Science Supervision and Management, [Respondent] prevented members of the Plume Team who used FTV from communicating their findings to key decision makers. On July 30, 2010, [Respondent] gave the Plume Team's Final Presentation to the team of key decision makers (including DOE Sec. Chu, DOI Sec. Salazar, USGS Dir. McNutt, the Directors of three DOE National Labs, etc.) who were determining the government's final estimate of the oil leak rate. Only the three members of the Plume Team who used PIV and underestimated the oil leak rate were informed of the Final Presentation and allowed to meet with the key decision makers. Members of the Plume Team using FTV were not informed of the Final Presentation. Thus, [Respondent] prevented the members using FTV from meeting with the key decision making team, and prevented "the timely communication of scientific findings" to key decision makers.*

The Complainant alleges that the Respondent prevented conflicting views from being reported to key decision makers. Two key meetings with decision makers are relevant to this allegation – the first on June 14, 2010 and the second on July 30, 2010. The Respondent did not attend either meeting. Available evidence shows that at the June 14<sup>th</sup> meeting presentations were made to Dr. McNutt, Director of USGS and Chair of the FRTF by two Plume Team members (Lasheras and Savas) representing the two methodologies (automated and manual feature tracking, respectively) used by the team. Dr. Shaffer, an FTV proponent, also was in attendance but didn't make a formal presentation. This meeting provided ample opportunity for conflicting views regarding the methods being employed by the Plume Team to be raised with Dr. McNutt. There is no evidence that the Respondent prevented conflicting views from being reported to key decision makers at this meeting.

A second meeting was held on July 30, 2010 in which the results of the Plume Team were presented to key decision makers including DOE Secretary Chu, DOI Secretary Salazar, USGS Director McNutt among others. This meeting was organized by Sandia National Labs. The Respondent was also unable to attend this meeting, and requested Plume Team members Werelye and Aliseda attend and deliver the presentation. The Respondent provided several slides for the presentation including one slide that reproduced the table from Appendix 1 of the Flow Team Final Report. The estimates from experts F and G were omitted from the table. The Respondent acknowledges this omission and states it was an accident.

From her attendance at the June 14<sup>th</sup> meeting, and subsequent emails, Dr. McNutt, the Chair of the FRTG, was well aware of the different approaches being used by the Flow Team and the conflicting results being obtained. The attendees at the July 30<sup>th</sup> meeting received a copy of the Flow Team Final Report in advance of the meeting and it included the complete table in Appendix 1 as well as complete and detailed appendices outlining all of the approaches used and estimates obtained, including from FTV. The text in the Results slide in the Final Presentation was essentially a verbatim copy of the last two paragraphs of the Executive Summary in the Final Report which had been reviewed by the full Plume Team. The text on this slide states that the leak "could be as large as 50,000 bbl/day" and also mentions a "joint estimated range of 35,000 to 60,000 bbl/day made "after consultation with groups from the Department of Energy". Although this whole paragraph is rather confusingly written, it is not consistent with the charge made by the Complainant that the Respondent was intentionally trying to "low ball" the flow rates being shown to decision makers. The 60,000 bbl/day figure is close to the current best



estimate of the actual flow rate and near the middle of the range of estimates given in Appendix 7 using the FTV approach.

The fact that two lines were omitted from the results slide in the July 30<sup>th</sup> presentation is indeed unfortunate, and one gets the impression from reading this file that if this had not occurred these misconduct charges would probably never have been filed. The Respondent admits this was a mistake, perhaps the result of working under excessive time pressure. This is certainly a plausible explanation although one that is admittedly hard to prove or disprove. The fact that the complete Flow Team report, available to meeting attendees prior to the meeting, included the complete table supports a finding that the Respondent was not trying to “hide” the estimates by F and G from the decision-makers.

**I therefore agree with all three members of the IRP that this was most likely a simple mistake, and not an act of scientific misconduct. Consequently, I find that this allegation lacks substance and no investigation is warranted.**

*Allegation 4. Fabrication of Findings and Failure to Provide Traceability of Data: In violation of NAO 202-735D, §6.01(a), §6.01(b), §6.01(c), §7.01, §7.02, [Respondent] added an additional estimate by PIV from a scientist who was not a member of the Plume Team to his Final Report and Final Presentation. [Respondent] did not reveal to the Plume Team’s members, to peer reviewers, to key decision makers, or to the public that he added an estimate from a scientist who was not a member of the Plume Team. It appears that [Respondent] also altered the values of the estimates by PIV to make them appear identical and more “consistent.”*

The basis of this allegation is the table in Appendix 1 of the Flow Team Final Report which lists low and high flow rate estimates for seven (unidentified) experts. The Complainant alleges that: (1) the Respondent added an additional estimate by PIV to the table from a scientist not a member of the Plume Team, (2) did not reveal to Plume Team members, peer reviewers, key decision makers or to the public that an additional estimate was added, and (3) that the Respondent altered estimates by PIV in this table to make them appear more “consistent”.

Appendix 1 was authored by two Plume Team members, Antonio Possolio and Pedro Espina, NIST statisticians who compiled and analyzed the data in this appendix. As the named authors of Appendix 1, Possolio and Espina have responsibility for its content including the data in the table. The Respondent is not a co-author of this appendix and is therefore not responsible for its content. In this appendix, Possolio and Espina describe where they obtained the data for the table and they appear to have gotten it directly from the investigators at meetings of the team, or in one case from the Plume Team’s Final Report, not from the Respondent. There is no evidence that the table and associated text in the appendix were altered after Possolio and Espina completed it. If that had occurred, surely they would have noticed these changes when their appendix was in review, when it was submitted, or in the 2 years since then.

**Given that Appendix 1 was not authored by the Respondent, and in the absence of any evidence that the table in Possolio and Espina’s appendix was altered after it was completed, I agree with two of the three members of the IRP that this allegation lacks substance and no investigation is warranted.**

### **3. CONCLUSIONS**

It is my judgment in this case that the four allegations described above do not have sufficient substance to warrant further investigation. The allegations of scientific misconduct against the Respondent are hereby dismissed.

In retrospect the Respondent could have produced a better documented and more clearly written report by including a timeline showing when key meetings were held or flow rates estimates obtained, by including a discussion of when and how any consensus estimates were arrived at, and by more clearly linking the results in the appendices to the main body of the report by, for example, reproducing the table from Appendix 1 in the main report. However, none of these limitations, in my opinion, rise to the level of scientific misconduct and in defense of the Respondent, this report was produced in the middle of a national emergency, under intense pressure and with very short deadlines.

Respectfully submitted by:

Dr. Robert S Detrick  
Assistant Administrator  
Office of Oceanic and Atmospheric Research

Date: 12/20/2012